

Service Manual

900MHz Cordless
Answering System

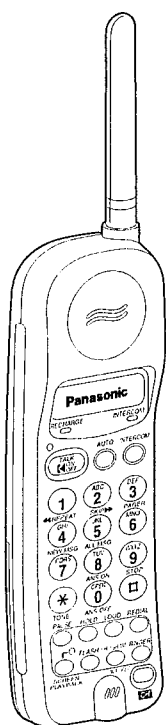
Telephone Equipment

KX-TCM939-B

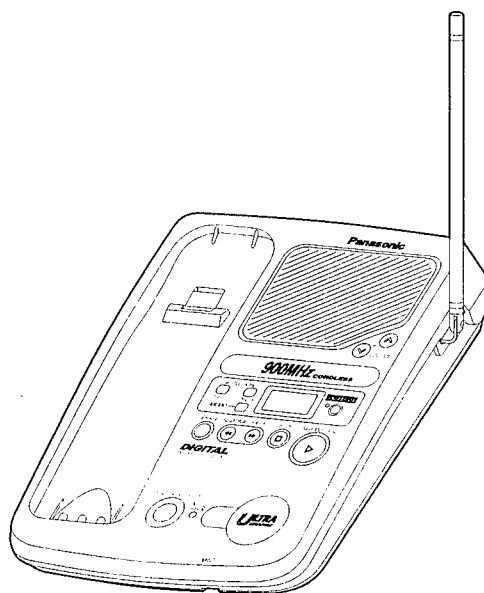
KX-TCM941-B

(for U.S.A.)

Black Version



(Portable Handset)



(Base Unit)

■ SPECIFICATIONS

	Base Unit	Portable Handset
Power Source:	AC Adaptor (KX-A11-6)	Rechargeable Ni-Cd battery
Receiving Frequency:	30 channels within 926.1~927.55 MHz	30 channels within 902.1~903.55 MHz
Receiving Method:	Double super heterodyne	Double super heterodyne
Transmitting Frequency:	30 channels within 902.1~903.55 MHz	30 channels within 926.1~927.55 MHz
Oscillation Method:	PLL synthesizer	PLL synthesizer
Detecting Method:	Quadrature Discriminator	Quadrature Discriminator
Tolerance of OSC Frequency:	±3.6 kHz	±3.6 kHz
Modulation Method:	F3 (frequency modulation)	F3 (frequency modulation)
ID Code:	20-bit	20-bit
Greeting Message and Incoming Message:	The total recording time is about 16 minutes	
Dial Mode:		Tone (DTMF)/Pulse
Redial:		Up to 30 digits
Speed Dialer:		Up to 16 digits
Power Consumption:		21 days at Standby, 6 hours at Talk
Dimension (H×W×D):	2 9/32" × 6 13/16" × 8 15/32" (58×173×215 mm)	10 13/32" × 2 1/8" × 1 11/32" (244×54×60 mm)
Weight	1.22 lbs. (554 g)	0.54 lbs. (244g) with battery

Design and specifications are subject to change without notice.

Panasonic

©1998 Kyushu Matsushita Electric Co., Ltd.
All rights reserved. Unauthorized copying and distribution is a violation of law.

MC-Service

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

TABLE OF CONTENTS

STANDARD BATTERY LIFE	2	SCHEMATIC DIAGRAM (Base Unit)	29
LOCATION OF CONTROLS	3,4	SCHEMATIC DIAGRAM (Portable Handset)	30
CONNECTION TO A TELEPHONE LINE	5	CIRCUIT BOARD (Portable Handset)	31
NEW OPERATION	6,7	BLOCK DIAGRAM (Base Unit) (Main P.C.B)	32
DISASSEMBLY INSTRUCTIONS	8	NEW CIRCUIT OPERATION (Base Unit)	32~34
ADJUSTMENT (Potable Handset)	9~12	NORMAL CIRCUIT OPERATION(Base Unit)	35~40
ADJUSTMENT (Base Unit)	13~15	BLOCK DIAGRAM (Portable Handset)(Control Block)	41
HOW TO CHECK THE RF UNIT	16, 17	NEW CIRCUIT OPERATION (Portable Handset)	42~45
CPU DATA (Base Unit)	18	TROUBLESHOOTING GUIDE	46~52
CPU DATA (Portable Handset)	19	CABINET ABD ELECTRICAL PARTS (Base Unit)	53
EXPLANATION OF IC TERMINALS (Base Unit)	20~22	CABINET ABD ELECTRICAL PARTS (Handset)	54
EXPLANATION OF CPU DATA COMMUNICATION	23~26	ACCESSORIES AND PACKING MATERIALS	55
FREQUENCY TABLE	26	TOOL	55
HOW TO REPLACE FLAT PACKAGE IC	27	REPLACEMENT PARTS LIST (Base Unit)	56~59
CIRCUIT BOARD (Base Unit) (Operational P.C.B)	27	REPLACEMENT PARTS LIST (Handset)	60~62
CIRCUIT BOARD (Base Unit)	28		

STANDARD BATTERY LIFE

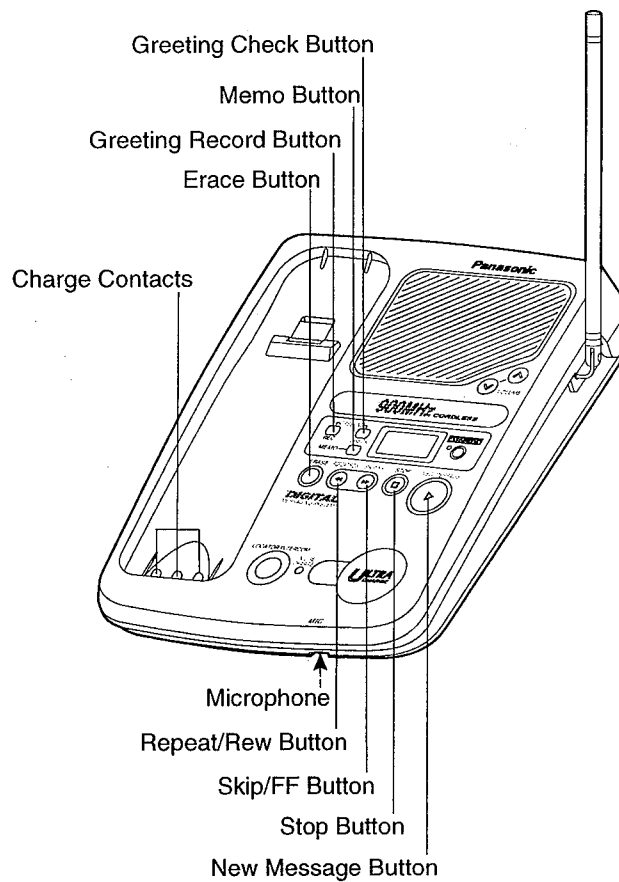
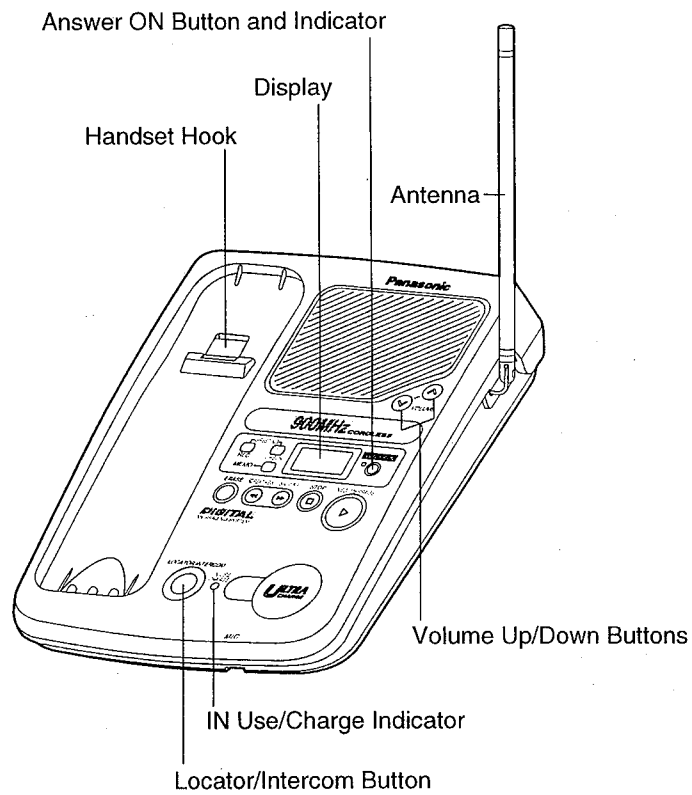
If your Panasonic battery is fully charged;

While in use (TALK)	Up to about 6 hours
While not in use (Stand-By)	Up to about 21 days

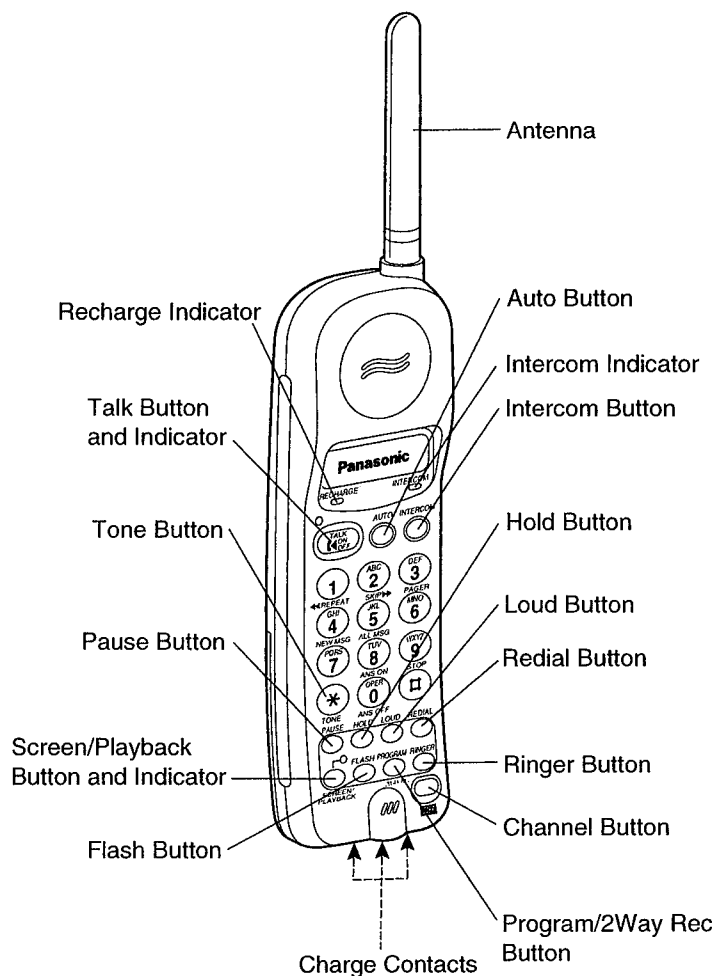
- Battery life may vary depending on usage conditions and ambient temperature.
- **Clean the handset and base unit charge contacts with a soft dry cloth once a month.**
Clean more often if the unit is subject to grese, dust or high humidity. If not, the battery may not charge properly.
- If the battery is fully charged, you do not have to place the handset on the base unit until the RECHARGE indicator flashes. This will maximize the battery life.
- The battery cannot be overcharged.

LOCATION OF CONTROLS

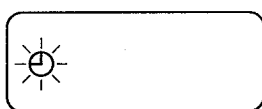
Base Unit



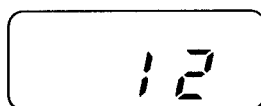
Portable Handset



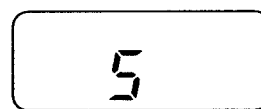
Base Unit Display



The clock needs adjusting.



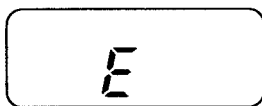
12 messages have been recorded.



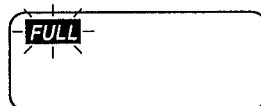
The speaker volume level is set to "5".

You can select:

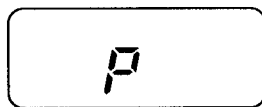
- 9 levels (0-8) while using the answering system.
- 8 levels (1-8) while using the speakerphone.



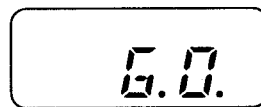
Your message was not recorded correctly. Record it again.



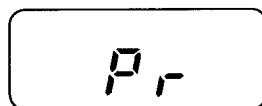
Memory is full. Erase some or all of the messages.



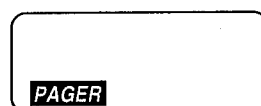
The unit is in programming mode.



The recording time is set to "greeting only".

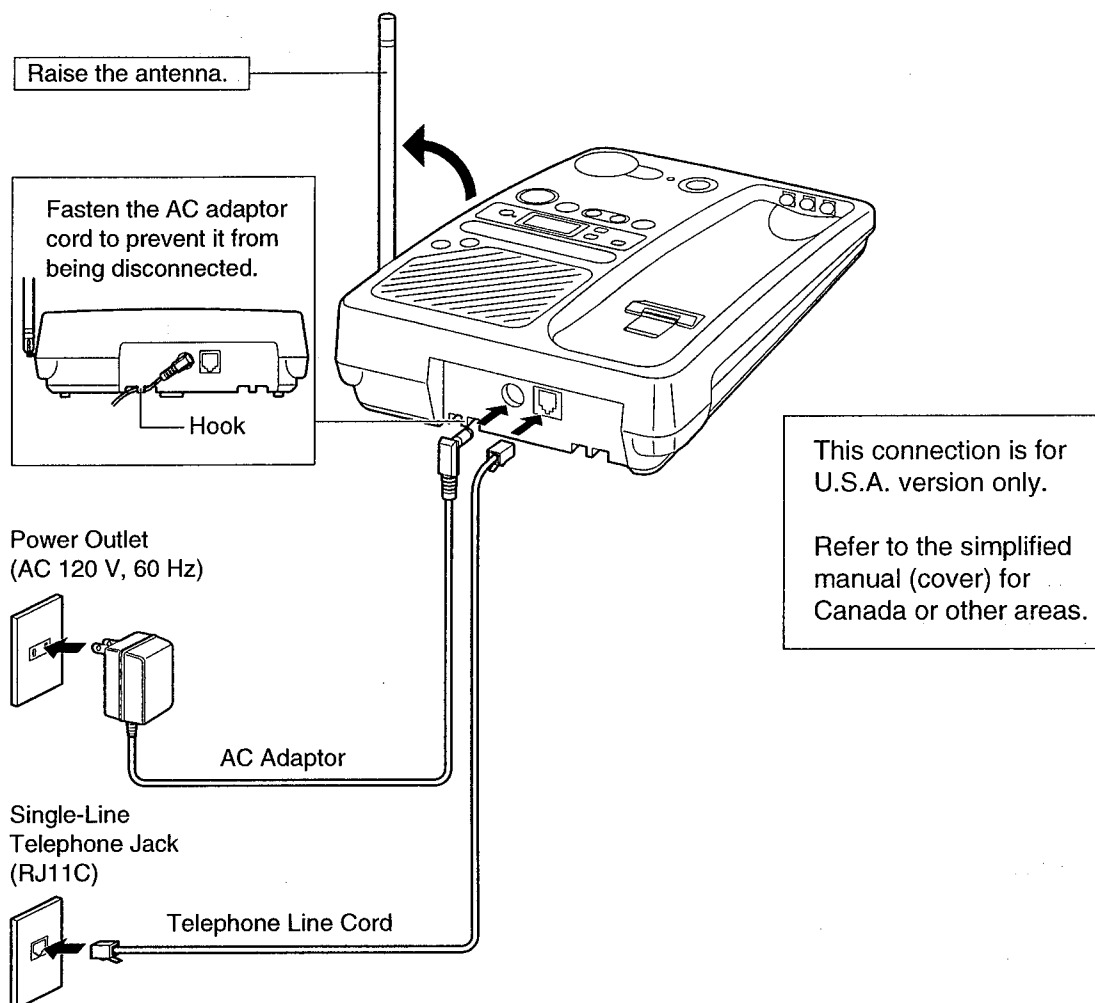


A pre-recorded message is being played.



The pager call mode is set to ON.

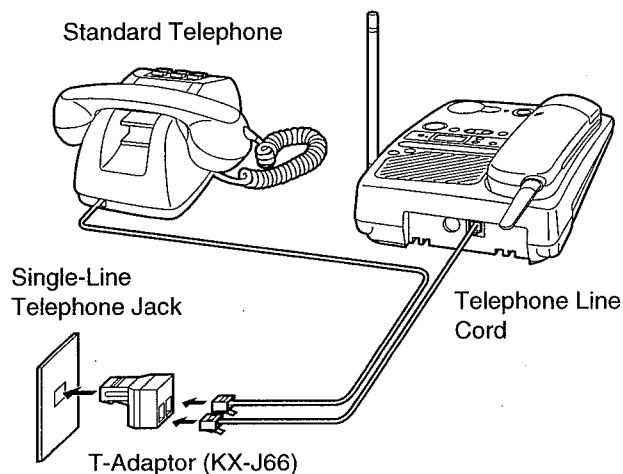
CONNECTION TO A TELEPHONE LINE



Notes:

- USE ONLY WITH Panasonic AC ADAPTOR KX-A11-6.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)

Adding Another Phone



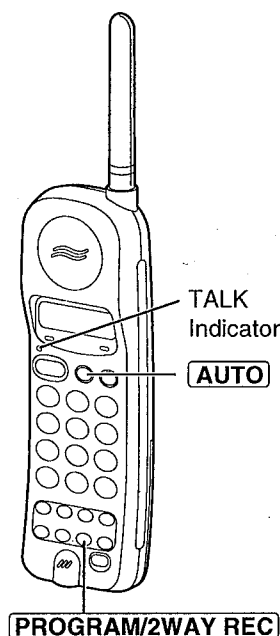
NEW OPERATION

Selecting the Dialing Mode

You can program the dialing mode by using the handset near the base unit. If you have touch tone service, set to TONE. If rotary service is used, set to PULSE. Your phone comes from the factory set to TONE.

The TALK indicator light must be off before programming.

- 1 Press **PROGRAM/2WAY REC**.
 - The TALK indicator flashes.
- 2 Press **AUTO**.
- 3 To select PULSE, press **#** twice.
OR
To select TONE, press ***** twice.
- 4 When finished, press **PROGRAM/2WAY REC**.

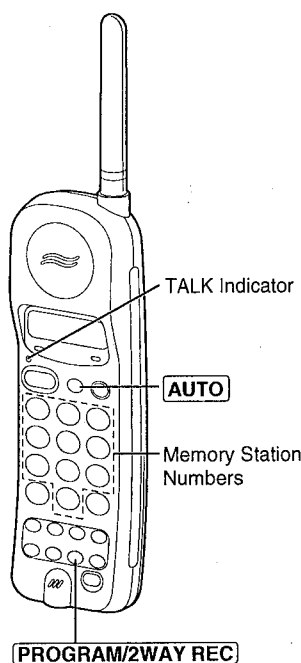


Speed Dialer

Storing Phone Numbers in Memory

You can store up to 10 numbers in the handset. The dialing buttons (0 to 9) function as memory stations. The TALK indicator light must be off before programming.

- 1 Press **PROGRAM/2WAY REC**.
 - The TALK indicator flashes.
- 2 Enter a phone number up to 16 digits.
 - If you misdial, press **PROGRAM/2WAY REC** to end storing, then restart from step 1.
- 3 Press **AUTO**.
- 4 Press a memory station number (0 to 9).

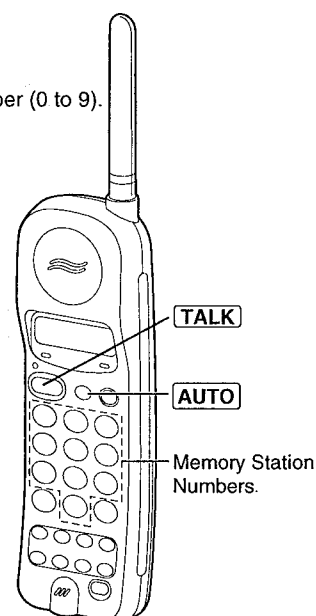


To erase a stored number

Press **PROGRAM/2WAY REC** ➡ **AUTO** ➡ the memory station number (0 to 9) for the phone number to be erased.

Dialing a Stored Number

- 1 Press **TALK**.
- 2 Press **AUTO**.
- 3 Press the memory station number (0 to 9).
 - The stored number is dialed.



Listening to Messages

You can see the total number of recorded messages on the display. If the ANSWER ON indicator flashes, new messages have been recorded.

Listening to only the new messages

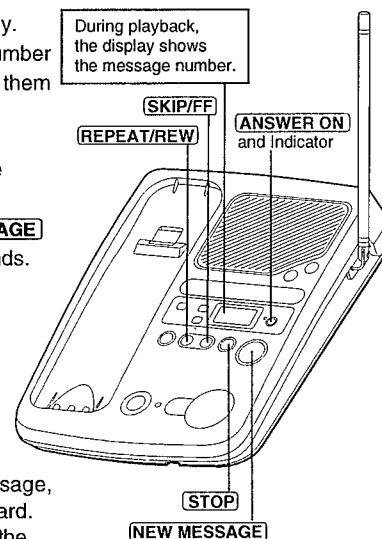
Press **NEW MESSAGE** briefly.

- The unit announces the number of new messages and plays them back.

During playback, the display shows the message number.

Listening to all of the recorded messages

Press and hold **NEW MESSAGE** firmly until a short beep sounds.



At the end of the last message, "End of final message" is heard. After the announcement, the unit will automatically turn the answering system back on.

MC-Service

During playback

To repeat/ rewind the message	<p>To repeat from the beginning the message Press [REPEAT/REW] briefly. (If you press within 5 seconds of playback, the previous message will be played.)</p> <p>To rewind part of the message Press and hold [REPEAT/REW] until you reach the desired place.</p> <ul style="list-style-type: none"> At the beginning of the message, 3 beeps will sound.
To skip/cue the message	<p>To skip to the next message Press [SKIP/FF] briefly.</p> <p>To cue to part of the message Press and hold [SKIP/FF] until you reach the desired place.</p> <ul style="list-style-type: none"> The message will be heard twice as fast. At the end of the message, 3 beeps will sound.
To stop the operation	<p>Press [STOP].</p> <ul style="list-style-type: none"> To resume playback, press [NEW MESSAGE]. To turn on the answering system, press [ANSWER ON].

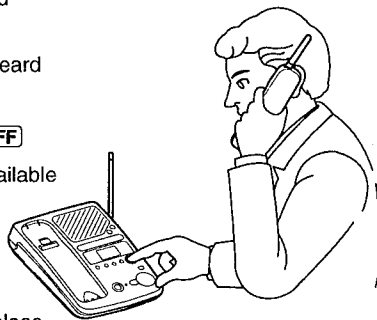
From the Handset

If someone else is in the room and you want to listen to the recorded messages privately, you can listen to them using the handset.

- Handset:
Press **[SCREEN/PLAYBACK]**.
 - The number of new messages is heard on the handset.



- Base unit:
To listen to new messages, press **[NEW MESSAGE]** briefly.
To listen to all of the messages, press and hold **[NEW MESSAGE]** firmly.
 - The messages will be heard on the handset.
 - [REPEAT/REW]**, **[SKIP/FF]** and **[STOP]** are also available during playback.



- When finished, press **[SCREEN/PLAYBACK]** or place the handset on the base unit.

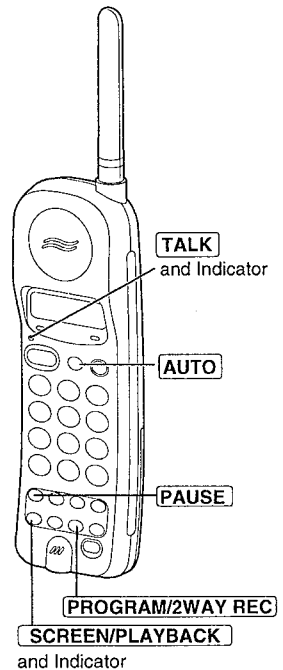
Pager Call

This feature allows you to alert your pager when the unit records an incoming message. You can retrieve the message from a touch tone telephone. First store the pager number, then turn on the pager call mode.

The TALK indicator light must be off before programming.

Storing the Pager Number

- Press **[PROGRAM/2WAY REC]**.
 - The TALK indicator flashes.
- Press **[SCREEN/PLAYBACK]**.
 - The indicator lights.
 - "P" is displayed on the base unit.
- Press **[#]**.
- Enter your pager number and then press **[PAUSE]** twice.
Enter the access code, if required by your pager company and then press **[PAUSE]** twice again.
 - Enter the call back number to be displayed on the pager (the number where your unit is connected).
 - Press **[#]**, if required by your pager company, to end the call.
 - If you misdial, press **[PROGRAM/2WAY REC]** then start from step 1.
 - You can enter a total of 48 digits.

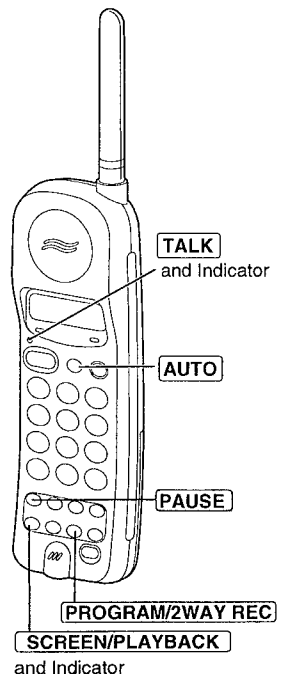


- When finished, press **[PROGRAM/2WAY REC]**.
 - The indicator lights go out.

Storing the 1-800 pager number

If you use a 1-800 pager number with your PIN code, store the pager number as follows.

- Press **[PROGRAM/2WAY REC]**.
 - The TALK indicator flashes.
- Press **[SCREEN/PLAYBACK]**.
 - The indicator lights.
 - "P" is displayed on the base unit.
- Press **[#]**.
- Enter the 1-800 pager number and then press **[PAUSE]** 3 times.
 - Enter the PIN code and then press **[PAUSE]** twice.
 - Enter the call back number to be displayed on the pager (the number where your unit is connected).
 - Press **[#]**, if required by your pager company, to end the call.
 - If you misdial, press **[PROGRAM/2WAY REC]** then start from step 1.
 - You can enter a total of 48 digits.
- When finished, press **[PROGRAM/2WAY REC]**.
 - The indicator lights go out.



DISASSEMBLY INSTRUCTIONS

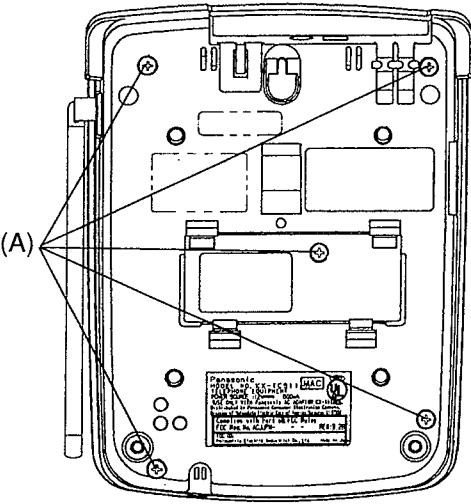
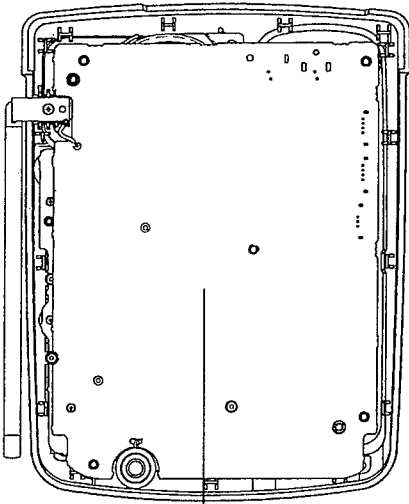


Fig. 1



Remove the P.C.Board

Fig. 2

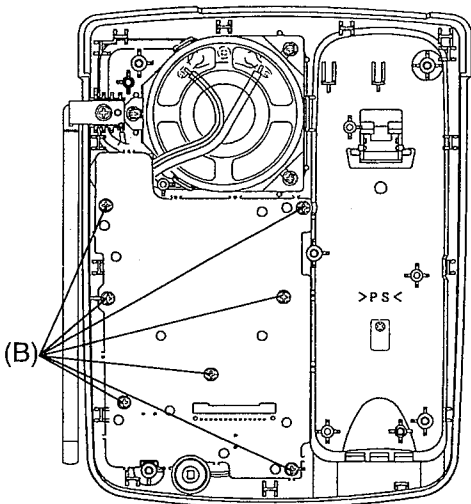


Fig. 3

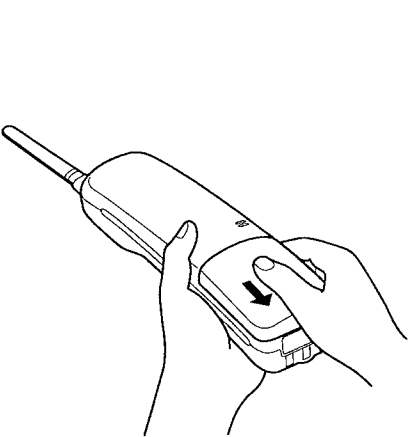


Fig. 4

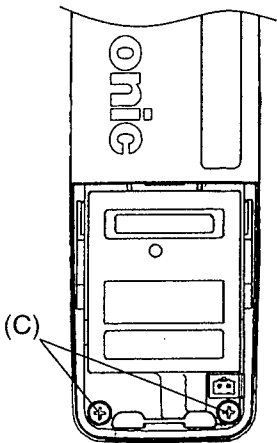
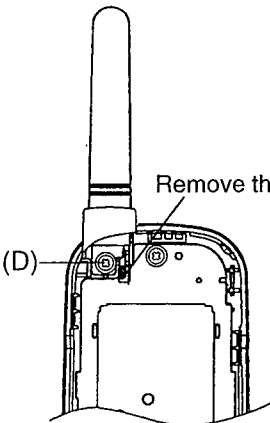
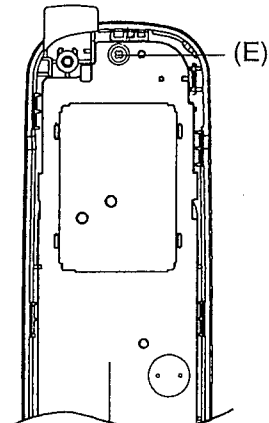


Fig. 5



Remove the solder

Fig. 6



Remove the P.C.Board

Fig. 7

Ref No.	Procedure	Shown in Fig. -	To Remove	Remove
1	1	1	Lower Cabinet	Screws (3×14) (A)×5
2	1, 2	2	Main P.C. Board	Remove the P.C.Board
3	1~3	3	Operation P.C. Board	Screws (2.6×10) (B)×7
4	4	4	Battery Cover	Remove the Battery Cover
5	4, 5	5	Rear Cabinet	Screws (2.6×12) (C)×2
6	4~6	6	Antenna	Screw (2.6×12) (D)×1
7	4~7	7	Main P.C. Board	Screw (2.6×12) (E)×1

ADJUSTMENT

OBJECTIVE

This procedure will enable the technician to make adjustments to the KX-TCM939-B/KX-TCM941-B PORTABLE HANDSET and BASE UNIT.

GENERAL INFORMATION

This procedure has 2 sections. The first section instructs the technician on how to align the PORTABLE HANDSET. We recommend aligning the PORTABLE HANDSET first, since you will need the PORTABLE HANDSET to align the BASE UNIT. The second section aligns the BASE UNIT. You can use either section separately, or together to align the entire cordless phone unit.

At the beginning of each section, you will find a preparation procedure instructing you on how to prepare the unit to the point of placing the unit in TEST mode. Please follow this procedure to insure proper alignment.

Each section's procedure consists of Adjustment Items adjusting one specific variable hardware component. Each Item lists the equipment needed, how to connect and setup the equipment, how to make the adjustment, and how to verify the adjustment if necessary.

Before the actual procedure, you will find a procedure detailing how to place that part in TEST mode. You will have to perform this procedure before each individual Adjustment Item.

Once aligned, please remove all equipment connections and solder points, and reassemble the unit. As a final check, power up the phone and check for PORTABLE HANDSET linking with the BASE UNIT.

EQUIPMENT

1. Radio Tester : Marconi Model 2295A or later.
2. 4.5 digit Digital Multimeter : B&K Model 2833 or compatible.
3. Oscilloscope, single or dual channel : Panasonic VP-5512P100 or compatible.
4. Telephone Analyzer : B&K Model 1050 or compatible.
5. DC Power Supply, capable of supply 3.9V DC at 100mA NOTE : only needed if Telephone Analyzer does not have DC VOLTS output available.
6. High Frequency Attenuator, 10dB or greater.
7. Corded Telephone.
8. High Frequency Cable : BNC end to open end.
9. Audio Cable : BNC end to alligator clip end.
10. High Frequency Adjustment Tool:
11. Isolation Capacitors, quantity of 2, 10 μ F maximum, 50V DC or greater.
12. Soldering Iron, solder, and various tools.

PORTABLE HANDSET PREPARATION

Please perform the following steps to prepare the PORTABLE HANDSET for alignment. Please refer to the PORTABLE HANDSET REFERENCE DRAWING for connection and test point locations.

1. Remove battery cover and battery.
2. Remove both screws at the case bottom.
3. Grabbing hold of the back near the bottom, gently pry off the back of the case.
4. Remove the antenna mounting screw. While heating the antenna solder connection, pull out the antenna.
5. Remove the top P.C.Board mounting screw.
6. Unsolder both speaker connections on P.C.Board.
7. Remove the PORTABLE HANDSET P.C.Board.
8. Remove the keypad membrane.
9. Solder High Frequency Cable open end to ANT and RF GND points.
10. Using the Digital Multimeter, measure DC VOLTS output on the Telephone Analyzer. Adjust the output voltage to 3.9V DC.
11. Solder battery connection wires at the points shown in the PORTABLE HANDSET REFERENCE DRAWING. Solder the positive lead to TP-V_{DD}, towards the component side of the P.C.Board. Solder the negative lead to the TP-V_{SS}. **DO NOT APPLY POWER TO THE PORTABLE HANDSET AT THIS TIME!!!!!!**
12. Solder a small, insulated piece of wire to **GND** as well.
13. Solder 1 isolation capacitor's positive lead to **SP+** test point (TP4). When soldering, keep the lead close to the P.C.Board as possible since you will lay the keypad membrane over part of this lead.
14. Solder a small, short, insulated wire to **MIC** test point (TP8).
15. Lay the keypad membrane over the keypad switch contacts.

KX-TCM939-B/KX-TCM941-B**SYMPTOM/REMEDY TABLE**

If you have one of the listed symptoms, please refer to this table and make the appropriate adjustments.

SYMPTOM	REMEDY
Speaker level is unstable	Adjust Item (A).
Does not link with BASE UNIT	Adjust Items (B) and (C).
Tx sound is unstable	Adjust Item (D).

PORTABLE HANDSET ADJUSTMENT PREPARATION

Please perform the following procedure before starting the Adjustment Procedure. You only have to perform this procedure only once to complete all Items, but you will have to perform this procedure to make an individual Adjustment Item.

1. You will need all equipment listed in the Item's EQUIPMENT section.
2. Setup all equipment as specified in the Item's PROCEDURE section SETUP portion.
3. Apply power to the PORTABLE HANDSET, and press TALK key.
4. Press 5, 8 and 0 keys at the same time.
5. Release the 3 keys. You should hear the PORTABLE HANDSET beep. If you do not hear a beep, remove the power from the PORTABLE HANDSET and repeat the last 2 steps.
6. Press the **INTERCOM** key, then press the **TALK** key. PORTABLE HANDSET should now be in TEST MODE (CH 1 TALK). The IN USE should be on. If the PORTABLE HANDSET is not in TEST MODE, remove the power and repeat the last 3 steps.
7. Remove the keypad membrane and lay it aside.

ADJUSTMENT PROCEDURE

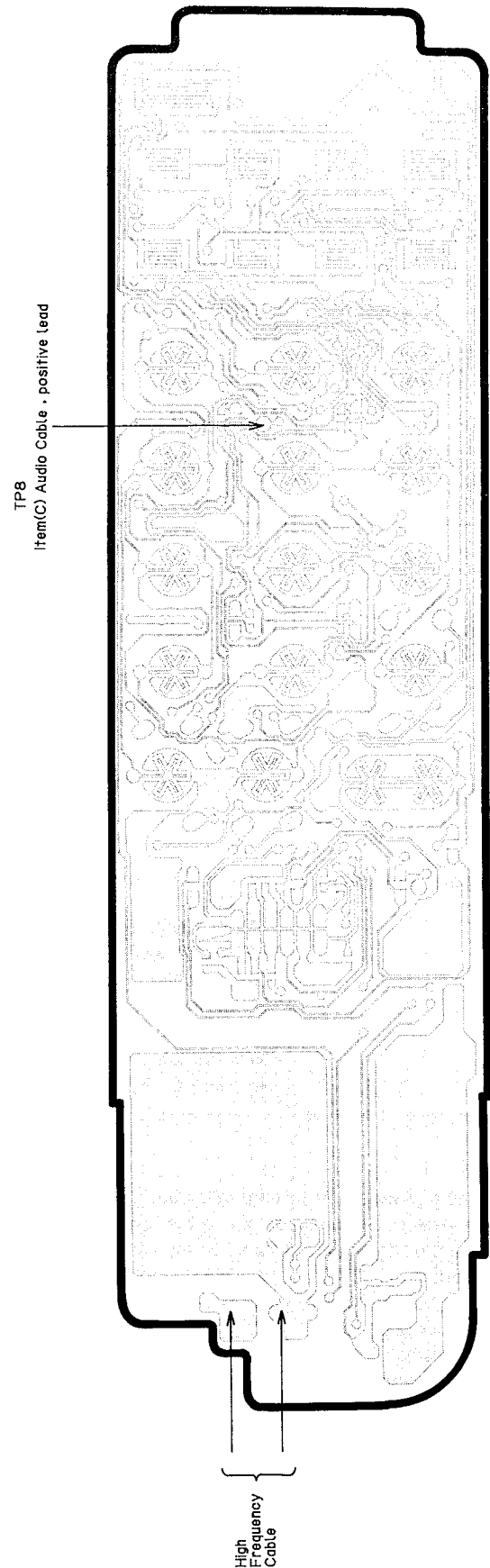
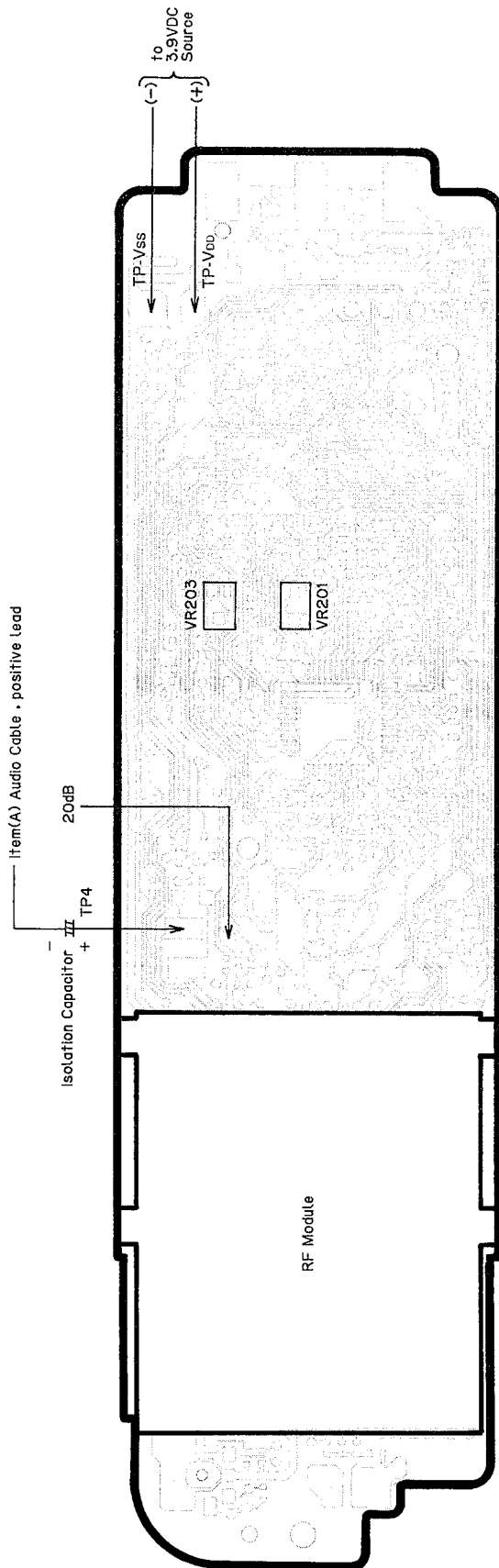
ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(A) SP Output	Marconi SETUP Put in Receiver Test Mode. RF GEN FREQ 902.1000 MHz LEVEL 60 dBμV SET MOD FREQ 1.000 kHz LEVEL 6.000 kHz High Frequency Cable to left RF Connector. Audio Cable positive lead to isolation capacitor, negative lead to GND , BNC end to AF INPUT connector.	Adjust VR203 until AF VOLTS equals -35 dBV +/-1 dBV Note This voltage reading is with no speaker or load attached to the PORTABLE HANDSET P.C.Board.

ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(B) 20dB Electric Detection (RX sensitivity confirmation and squelch adjustment)	<p>Marconi SETUP Put in Receiver Test Mode. RF GEN FREQ 902.1000 MHz LEVEL 60 dBμV SET MOD FREQ 1.000 kHz LEVEL 6.000 kHz One end of BNC cable to left RF connector, other end to Attenuator Input. Audio Cable positive lead to isolation capacitor, negative lead to GND, BNC end to AF INPUT connector.</p> <p>Oscilloscope SETUP X1 probe connected to INPUT 1. Probe ground connected to GND. TIME/DIV 1ms VOLT/DIV 1V Auto trigger</p> <p>Attenuator SETUP High Frequency Cable to Attenuator Output.</p>	<p>On Marconi, press SINAD until the display shows the SINAD value and press dB. Then press RF GEN and LEVEL. Lower RF GEN LEVEL at SINAD 12 dB and confirm that RF GEN LEVEL is less than 5 dBμV. When level is more than 5 dBμV, change RF unit.</p> <p>Attach the oscilloscope probe to 20 dB test point. When RF GEN LEVEL is set at +8 dBμV, confirm that the signal of 20 dB TEST POINT is Low. After that, set RF GEN LEVEL at -7 dBμV, and confirm that the signal of 20 dB TEST POINT is High. When level is NG, change RF unit.</p>
(C) MIC Input (MIC Modulation)	<p>Marconi SETUP Put in Transmitter Test mode. AF GEN FREQ 1.000 KHz LEVEL 15 mV Connect High Frequency Cable to right RF connector. Connect Audio Cable positive lead to MIC, negative lead to GND, BNC end to AF GEN OUTPUT.</p>	<p>Adjust VR202 until Marconi MOD LEVEL equals 7 kHz +/- 0.5 kHz.</p>
(D) Standard Frequency	<p>Marconi SETUP Put in Transmitter Test mode. AF GEN FREQ 1.000 kHz LEVEL 21 mV Connect High Frequency Cable to right RF connector. Connect Audio Cable positive lead to MIC, negative lead to GND, BNC end to AF GEN OUTPUT</p>	<p>Check Marconi TX FREQ equals 926.100 MHz +/-0.003 MHz. When value is overed 926.100 MHz +/-0.003 MHz, change RF unit.</p> <p>Note This Item's setup is exactly the same as Item (C). If you have done Item (C), simply look at TX FREQ and make the adjustment.</p>

Once aligned, please perform the following procedure.

1. Disconnect all equipment and solder connections. Use solder wick to clean up any solder you added.
2. Install the keypad membrane on top of the PORTABLE HANDSET keys.
3. Install the PORTABLE HANDSET P.C.Board.
4. Solder speaker wires back onto the P.C.Board observing correct polarity.
5. If you will align Item (C) RX Input in BASE UNIT, then solder a short wire across the MIC leads. Remember to unsolder this wire after you completed the BASE UNIT alignment.
6. Insert antenna into the case.
7. Install antenna and top P.C.Board mounting screws and solder antenna connection.
8. Install case back and bottom mounting screws.
9. DO NOT INSTALL THE BATTERY AT THIS TIME!!!!!!

PORTABLE HANDSET REFERENCE DRAWING



MC-Service

ADJUSTMENT

BASE UNIT PREPARATION

Please prepare the BASE UNIT before performing any adjustment procedures. Refer to the BASE UNIT REFERENCE DRAWING for connection and test point locations.

1. Unscrew all 5 screws from bottom of cabinet. Remove cabinet bottom.
2. Unsolder antenna wire at RF module.
3. Solder a test mode diode **CDLTEST** as shown on the BASE UNIT REFERENCE DRAWING.
4. Solder one isolation capacitor's positive lead to the main P.C.Board **TIP** point and the other isolation capacitor's positive lead to the main P.C.Board **RING** point.
5. Connect the Audio Cable, positive lead to the **TIP** isolation capacitor's free lead, the negative lead to the **RING** isolation capacitor's free lead. Do not connect the BNC end of the cable.
6. Connect the Telephone Analyzer **PHONE TEST JACK #1** to the BASE UNIT P.C.Board phone jack.
7. Connect the corded telephone to the Telephone Analyzer **PHONE TEST JACK #2**.
8. Remove main P.C.Board from cabinet top and place beside cabinet.
9. Solder High Frequency Cable open end to ANT and RF GND as specified in BASE UNIT REFERENCE DRAWING.

SYMPTOM/REMEDY TABLE

If you have one of the listed symptoms, please refer to this table and make the appropriate adjustments.

SYMPTOM	REMEDY
Transmission sound to PORTABLE HANDSET receiver is unstable	Adjust Items (A) and (B).
Does not link with PORTABLE HANDSET	Adjust Items (C) and (D).

BASE UNIT ADJUSTMENT PREPARATION

Please perform the following steps to prepare the BASE UNIT for the Adjustment procedure.

1. Connect P.C.Board to all equipment as specified in **PROCEDURE** section, **SETUP** portion.
2. Connect AC Adaptor to AC Jack of BASE UNIT main P.C.Board.
3. Press **LOCATOR/INTERCOM** button twice. BASE UNIT P.C.Board should be in TEST MODE (CH1 TALK). If unit is not in TEST MODE, remove power from P.C.Board and repeat last step.

ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(A) Standard Frequency	Marconi SETUP Place in Transmitter Test mode. AF GEN FREQ 1.000kHz LEVEL 21mV High Frequency Cable to right RF connector. Telephone Analyzer Corded Phone Take phone off hook	Check Marconi TX FREQ equals 902.100 MHz +/-0.003 MHz . When value is overed 902.100 MHz +/-0.003 MHz , change RF unit. Note This item's setup is exactly the same as Item (C). If you have done Item (C), simply look at TX FREQ on the Marconi and make the adjustment.

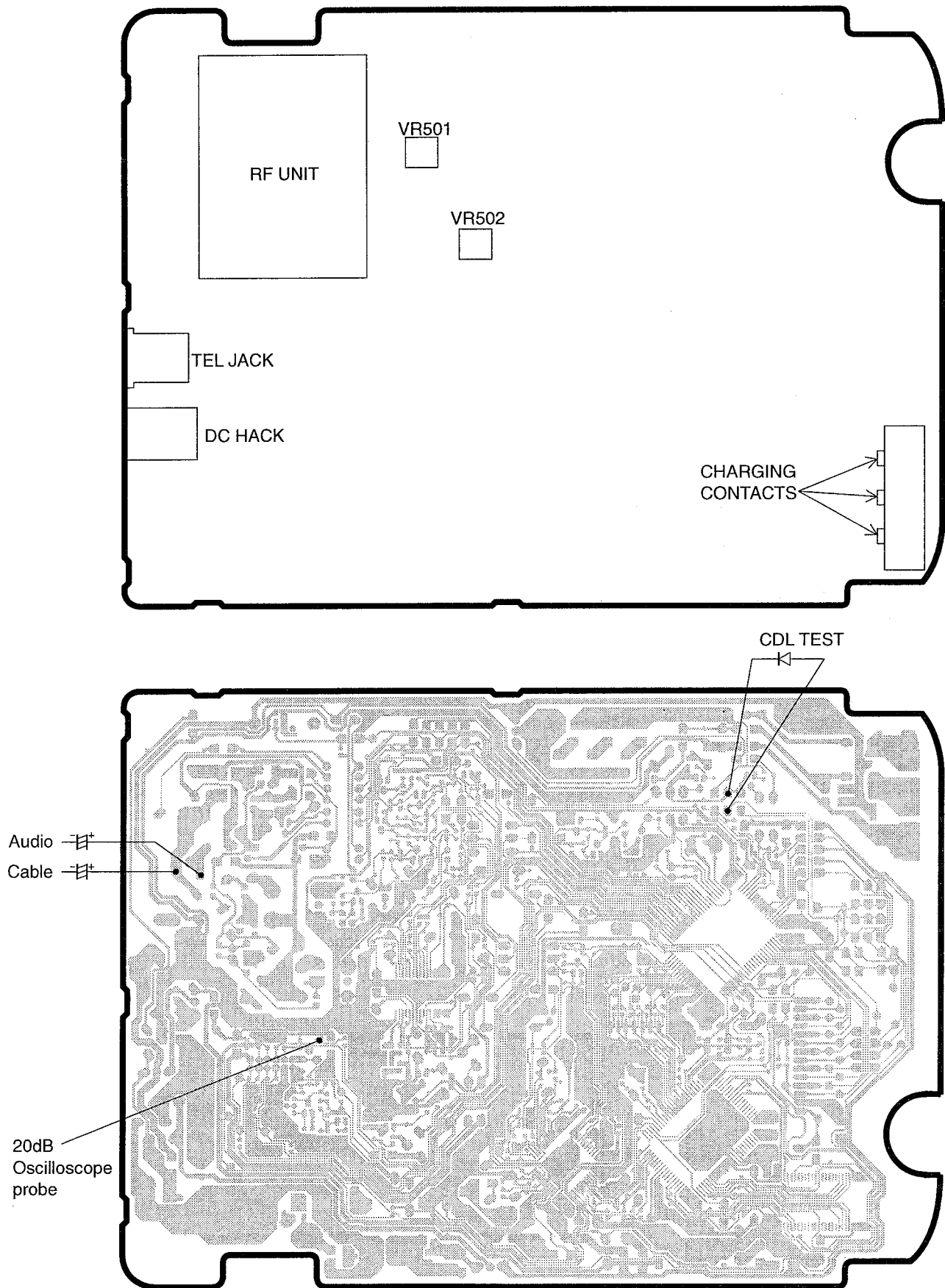
KX-TCM939-B/KX-TCM941-B

ADJUSTMENT ITEM DESCRIPTION	EQUIPMENT	PROCEDURE
(B) TX Output	Marconi SETUP Put in Receiver Test Mode. RF GEN FREQ 926.1000 MHz LEVEL 60 dB μ V SET MOD FREQ 1.000 kHz LEVEL 5.000 kHz High Frequency Cable to left RF connector. Audio Cable positive lead to TIP isolation capacitor, negative lead to RING isolation capacitor, BNC end to AF INPUT connector. Telephone Analyzer Corded Telephone Take phone off hook	Adjust VR501 until AF VOLTS equals -18.2 dBV +/- 2 dBV Note You do not need to take the corded phone off hook, but you will hear the 1kHz tone. This will insure that your setup is probably working.
(C) RX Input (Line Modulation)	Marconi SETUP Place in Transmitter Test mode. AF GEN FREQ 1.000kHz LEVEL 38mV High Frequency Cable to right RF connector. Telephone Analyzer Corded Phone Take phone off hook KX-TCM939-B/KX-TCM941-B Portable Handset Placed in TEST mode by inserting battery while pressing 1, 9 and * keys	Adjust VR502 until MOD LEVEL equals 6.5 kHz +/-0.5 kHz Notes You need to place the PORTABLE HANDSET in TEST mode to drown spurious RF signals being picked up at the BASE UNIT. By shorting the MIC leads insures that you are sending an unmodulated RF signal. You need the corded phone off hook to keep the telephone analyzer from sending a dial tone to the unit under test. The dial tone adds to the MOD LEVEL value greatly.
(D) 20dB Electric Detection (RX sensitivity conformation and squelch adjustment)	Marconi SETUP Put in Receiver Test Mode. RF GEN FREQ 926.1000 MHz LEVEL 60 dB μ V SET MOD FREQ 1.000 kHz LEVEL 5.000 kHz One end of BNC cable to left RF connector, other end to Attenuator Input. Audio Cable positive lead to TIP isolation capacitor, negative lead to RING isolation capacitor, BNC end to AF INPUT connector. Oscilloscope SETUP X1 probe connected to INPUT 1. Probe ground connected to GND . TIME/DIV 1ms VOLT/DIV 1V Auto trigger Attenuator SETUP High Frequency Cable to Attenuator Output Telephone Analyzer Corded Phone Take off hook	On Marconi, press SINAD until the display shows the SINAD value and press dB . Then press RF GEN and LEVEL . Lower RF GEN LEVEL at SINAD 12 dB and confirm that RF GEN LEVEL is less than 5 dBμV . When level is more than 5 dB μ V, change RF unit. Attach the oscilloscope probe to 20dB test point. When RF GEN LEVEL is set at +8 dB μ V, confirm that the signal of 20 dB TEST POINT is Low. After that, set RF GEN LEVEL at -7 dB μ V, and confirm that the signal of 20 dB TEST POINT is High. When level is NG, change RF unit.

Once aligned, please reassemble the base unit. Also take off the back of the PORTABLE HANDSET and unsolder the MIC lead short wire if you previously installed it.

MC-Service

BASE UNIT REFERENCE DRAWING



HOW TO CHECK THE RF UNIT

Factory supply only assembled RF unit for base unit and portable handset of KX-TCM939-B/KX-TCM941-B. (Factory does not supply each parts on RF Unit.) When checking the RF Unit, refer to pages 16 and 17.

Portable Handset

- 1) Warm up the Marconi Radio Tester for at least 30 minutes to allow internal crystal oscillation to become stable.
- 2) Refer to figures below for portable handset wire connections.
- 3) Disconnect the handset antenna from the PCB. If you allow the antenna to remain and be a load, the readings will be wrong.
- 4) Supply DC 3.9V Handset PCB using a DC power supply.
- 5) Solder RF cable to ANT and GND and connect BNC side to Marconi. Use 100 W max. RF Input.
- 6) Press **TALK**, then press "5", "8" and "0" simultaneously.
- 7) Press **DIRECT** or **INTERCOM**, press **TALK**.

Carrier Frequency Check:

1. Set Marconi to Transmit Test (press **TX TEST** button).
2. Check TX Frequency = **926.100 MHz \pm 3.0 kHz**.
3. When value is off, adjust **VRfreq**.
4. If can't adjust replace RF PCB.

Transmit Power Check:

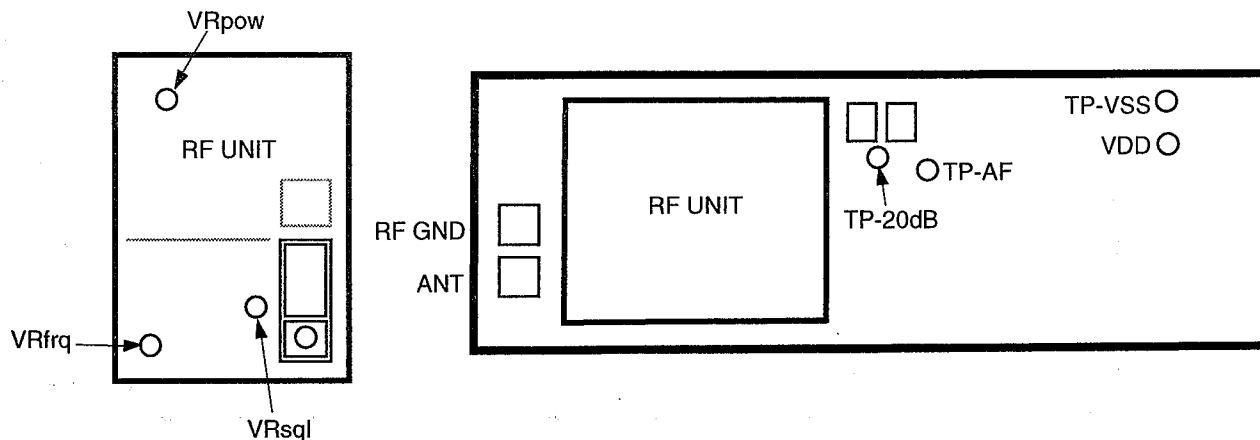
1. Press **dBm** button on Marconi.
2. Check Marconi TX Power reading. It should equal **-3.5 dBm \pm 4 dBm** (-7.5 dBm ~ +1.5 dBm).
3. When the value is off, adjust **VRpow** to **-3.5 dBm**.
4. If can't adjust replace RF PCB.

Receiving Sensitivity Check:

1. Connect audio cable BNC side to AF INPUT in Marconi and other side to TP-AF and TP-VSS (GND).
2. Set Marconi to **RX TEST** mode. Enter the following setting:
 - (a) Frequency = **902.100 MHz**
 - (b) Level = **60 dB μ V**
 - (c) Set Modulation = **1.000 kHz**
 - (d) Level = **6.000 kHz**
3. Press the **SINAD** button on Marconi until the display shows SINAD value. Press the **dB** button.
4. Press the **RF GEN** and **LEVEL** button.
5. Using the **VARIABLE** knob on Marconi decrease RF GEN LEVEL value until **SINAD** value is **12 dB**.
6. Check the **RF GEN LEVEL**. This should be **less than -2 dB μ V** (+4 dB μ Vemf). If can't adjust replace RF PCB.

Squelch Check:

1. Connect scope probe (X1) lead to TP-20 dB, negative to TP-VSS and BNC end to scope.
2. Set scope to the following condition: TIME/DIV = 1 msec, VOLT/DIV = 1 V
3. Set **RF GEN LEVEL** to **+2 dB μ V** (+8 dB μ Vemf). Check scope voltage is **LOW**.
4. Set **RF GEN LEVEL** to **-13 dB μ V** (-7 dB μ Vemf). Check scope voltage is **HIGH**.
5. When scope does not show above condition, adjust **VRsql** until scope voltage toggles between **LOW & HIGH**.
6. When **RF GEN LEVEL** is **-5.5 dB μ V** (+0.5 dB μ Vemf). If can't adjust replace RF PCB.



Base Unit

- 1) Please refer to figures below for base unit wire connection.
- 2) Solder wire connections from TEST to TEST COM.
- 3) Connect the AC Adaptor (KX-A11-6) to base unit.
- 4) Press LOCATOR twice to set base to test mode.

Carrier Frequency Check:

1. Solder RF cable to ANT and RF GND.
2. Set Marconi to Transmit Test mode by pressing **TX TEST**.
3. Check TX Frequency as shown on CRT. This should be **902.100 MHz \pm 3 kHz**.
4. Adjust value when this is above **902.100 MHz \pm 3 kHz**. If can't adjust replace RF PCB.

Transmit Power Check:

Check **TX POWER** reading equals to **-7 dBm \pm 4 dBm** (reading should -11 dBm ~ -3 dBm).
If reading is given in μ W, press **dB** button.
When value is off, adjust **VRpow** to **-7 dBm**. If can't adjust replace RF PCB.

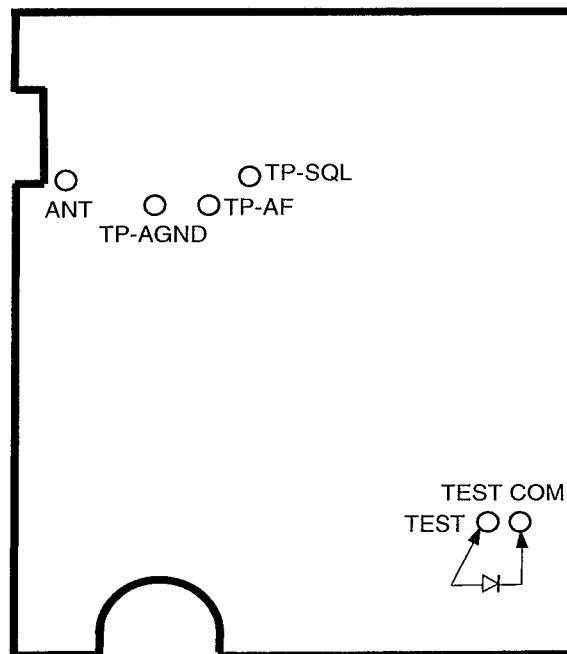
Receiving Sensitivity Check:

1. Connect audio cable positive lead to TP-AF, negative lead to TP-AGND and BNC end to AF INPUT.
2. Set Marconi to Receiver Test mode by pressing **RX TEST**. Enter the following value:
 - (a) RF Frequency = **926100 MHz**
 - (b) LEVEL = **60 dB μ V**
 - (c) Modulation Frequency = **1.000 kHz**
 - (d) LEVEL = **5.000 kHz**
3. Press **SINAD** button until the display shows the SINAD value and press **dB** button.
4. Press **RF GEN** and **LEVEL** buttons. Using the **VARIABLE** knob. Decrease RF GEN LEVEL until **SINAD** value is **12 dB**.
5. Check the **RF GEN LEVEL** equals **less than -2 dB μ V** (+4 dB μ Vemf). When value is over, change RF unit.

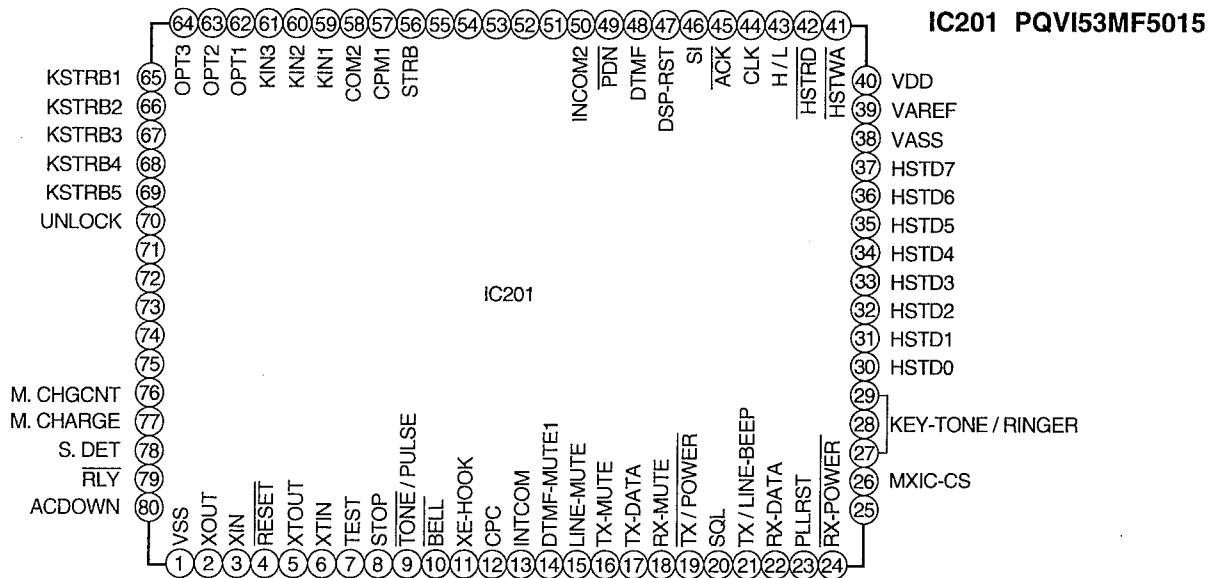
Squelch Check:

1. Keep same RX TEST settings as in **Receiving Sensitivity Check**.
2. Connect scope (X1) positive lead to TP-SQL, negative lead to TP-AGND and BNC end to scope. Set scope to following condition.
 - (a) TIME/DIV = **1 msec**.
 - (b) VOLT/DIV = **1 V**
3. Set **RF GEN LEVEL** to **+2 dB μ V** (+8 dB μ Vemf). Check scope voltage is **LOW**.
4. Set **RF GEN LEVEL** to **-13 dB μ V** (-7 dB μ Vemf). Check the scope voltage is **HIGH**.
5. When the scope does not above condition, adjust **VRsq** until scope voltage toggles between **LOW & HIGH**.
6. When RF GEN LEVEL is **-5.5 dB μ Vemf** (+0.5 dB μ Vemf). If can't adjust replace RF PCB.

Flow Solder Side View



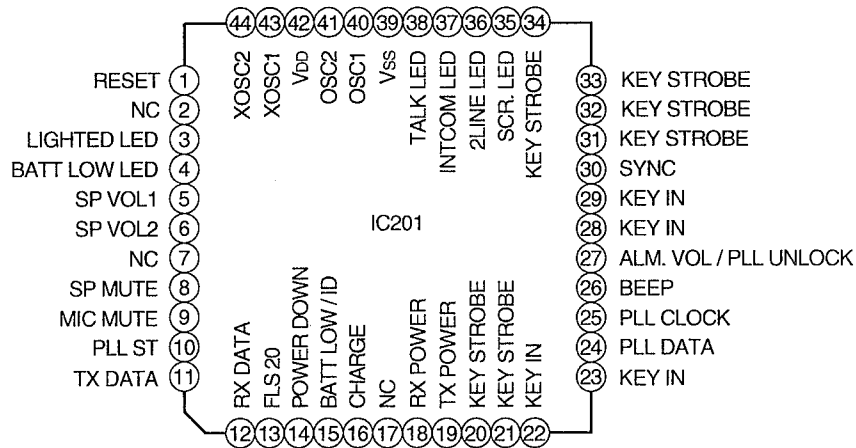
CPU DATA (Base Unit)



Pin	Description	I / O	High	Low	High-Z	Pin	Description	I / O	High	Low	High-Z
1	VSS	-	-	GND	-	41	HSTWR	O	-	Write	-
2	XOUT	O	-	-	-	42	HSTRD	O	-	Read	-
3	XIN	I	-	-	-	43	HI / LO	O	High	Low	-
4	RESET	I	Normal	RESET	-	44	CPS / CLOCK	O	-	-	-
5	XTOUT	O	-	-	-	45	DPS - ACK	O	Active	Normal	-
6	XTIN	O	-	-	-	46	SI	O	-	-	-
7	TEST	I	-	GND	-	47	DRST	O	Reset	-	-
8	STOP	I	-	STOP	-	48	DTMF	O	Active	Normal	-
9	TP	I	Pulse	Tone	-	49	DPS-PDN	O	-	Power Down	-
10	BELL	I	-	BELL	-	50	INTERCOM (TX) TOUT	O	MUTE	INT' COM	-
11	EXHOOK	I	EXHOOK	-	-	51	Not Used	I	-	Fixed	-
12	CPC	I	CPC	-	-	52	Not Used	I	-	Fixed	-
13	INTERCOM (RX)	O	INT' COM	MUTE	-	53	Not Used	I	-	Fixed	-
14	DTMFMUTE1	O	UNMUTE	MUTE	-	54	Not Used	I	-	Fixed	-
15	LINE MUTE	O	MUTE	UNMUTE	-	55	Not Used	I	-	Fixed	-
16	TXMUTE	O	MUTE	UNMUTE	-	56	STROBE (MC4094)	O	Strobe On	Strobe Off	-
17	TXDATA	O	-	-	-	57	COM1	O	-	-	1 / 2VDD
18	RXMUTE	O	MUTE	UNMUTE	-	58	COM2	O	-	-	1 / 2VDD
19	TXPOWER	O	-	On	Off	59	KEY IN	I	OFF	ON	-
20	SQLCH	I	Disable	Enable	-	60	KEY IN	I	OFF	ON	-
21	TX BEEP	O	-	-	-	61	KEY IN	I	OFF	ON	-
22	RXDATA	I	-	-	-	62	OPT IN	I	OFF	Option	-
23	PLLST	O	Normal	Active	-	63	OPT IN	I	OFF	Option	-
24	RXPOWER	O	-	On	Off	64	OPT IN	I	OFF	Option	-
25	DTMFMUTE2	O	MUTE	UNMUTE	-	65	KEY / OPT STROBE	O	Strobe Off	Strobe On	-
26	MXIC-CS	I	-	Active	-	66	KEY / OPT STROBE	O	Strobe Off	Strobe On	-
27	KTONE / RINGER	O	Active	Normal	-	67	KEY / OPT STROBE	O	Strobe Off	Strobe On	-
28	BEPCTL1	O	-	Low	High	68	KEY / OPT STROBE	O	Strobe Off	Strobe On	-
29	BEPCTL2	O	-	Low	High	69	KEY / OPT STROBE	O	Strobe Off	Strobe On	-
30	D0	I / O	-	-	-	70	PLL-UNLOCK	I	Unlock	Lock	-
31	D1	I / O	-	-	-	71	Not Used	I	-	Fixed	-
32	D2	I / O	-	-	-	72	Not Used	I	-	Fixed	-
33	D3	I / O	-	-	-	73	Not Used	I	-	Fixed	-
34	D4	I / O	-	-	-	74	Not Used	I	-	Fixed	-
35	D5	I / O	-	-	-	75	Not Used	I	-	Fixed	-
36	D6	I / O	-	-	-	76	CHARGE CTL	O	-	TRICKLE	ULTRA
37	D7	I / O	-	-	-	77	CHARGE	I	Non Charge	Charge	-
38	VASS	-	-	GND	-	78	SHORT DET	I	SHORT	Normal	-
39	VAREF	-	VDD	-	-	79	RLY	O	-	ON	OFF
40	VDD	-	VDD	-	-	80	ACDOWN	I	OFF	ON	-

CPU DATA (Portable Handset)

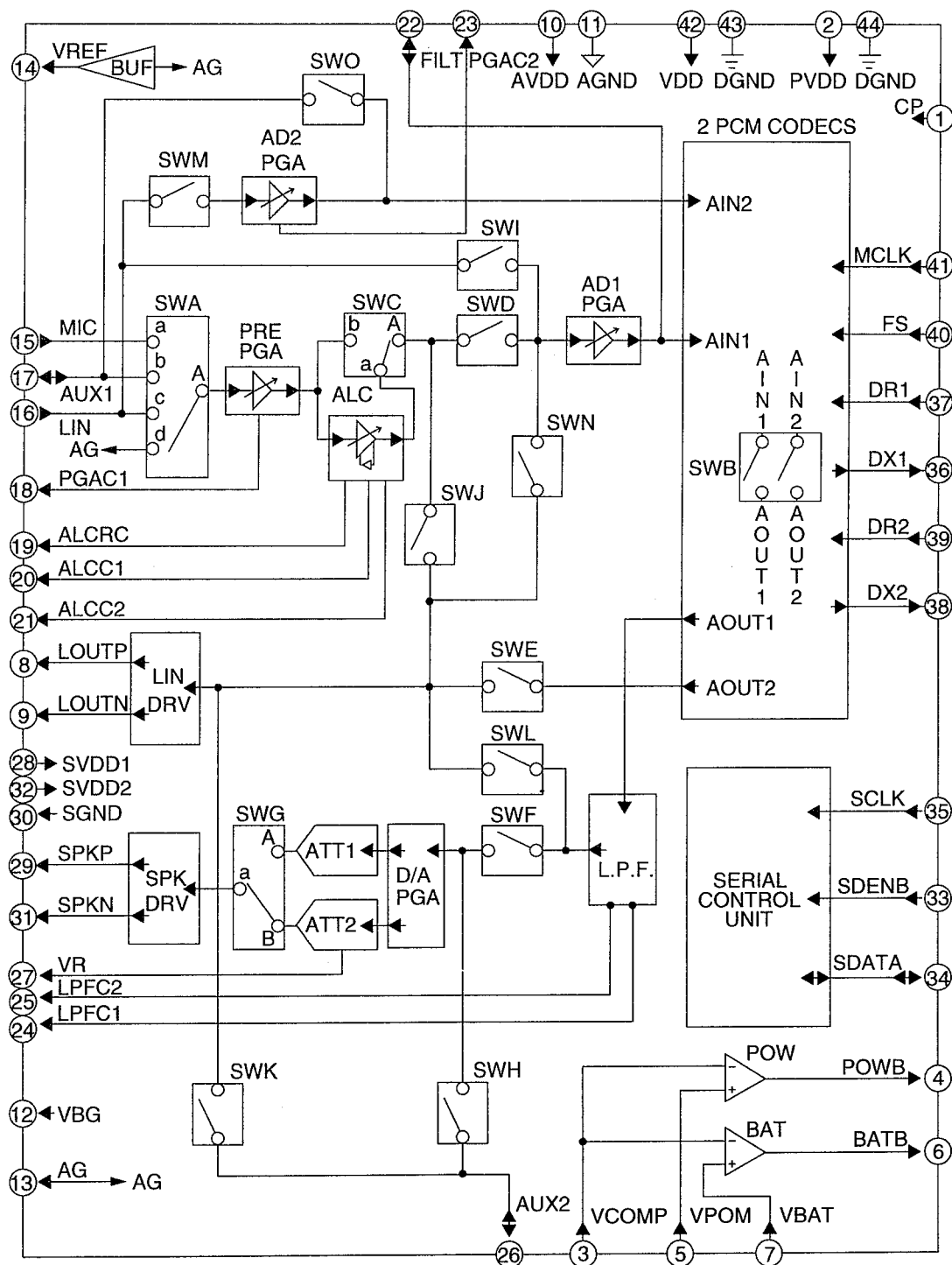
IC201 MN150837KD2



Pin	Description	I/O	High	Low	High-Z	Pin	Description	I/O	High	Low	High-Z
1	RESET	I/O		RESET		23	KEY IN	I		KEY IN	
2	Not Used	-				24	PLL DATA	I/O			
3	LIGHTED LED	I/O	ON	OFF		25	PLL CLOCK	I/O			
4	BATT.LOW LED	I/O	OFF	ON		26	BEEP	I/O			
5	SP VOL.1	I/O				27	ALM. VL/PLK UK	I/O	High/lock	Low/UNLOCK	
6	SP VOL.2	I/O				28	KEY IN	I		KEY IN	
7	Not Used	-				29	KEY IN	I		KEY IN	
8	SP MUTE	I/O	MUTE			30	Not Used	O			
9	MIC MUTE	I/O	MUTE			31	KEY STROBE	O			
10	PLL ST	I/O				32	KEY STROBE	O			
11	TX DATA	I/O				33	KEY STROBE	O			
12	RX DATA	I				34	KEY STROBE	O			
13	FLS20	I/O		Electric Field		35	SCR.LED	O		ON	OFF
14	POW DOWN	I/O		POWDOWN		36	2LINE LED	O		ON	OFF
15	ID/BAT.LOW	I/O		BAT.LOW		37	INT.LED	I/O		ON	OFF
16	CHARGE	I/O		CHARGE		38	TLK.LED	I/O		ON	OFF
17	Not Used	-				39	GND	-			
18	RX POW	I/O		ON	OFF	40	MAIN CLOCK	O			
19	TX POW	I/O		ON	OFF	41	MAIN CLOCK	I			
20	KEY STROBE	I/O				42	POWER SUPPLY	-			
21	KEY STROBE	I/O				43	SUB CLOCK	I			
22	KEY IN	I		KEY IN		44	SUB CLOCK	O			

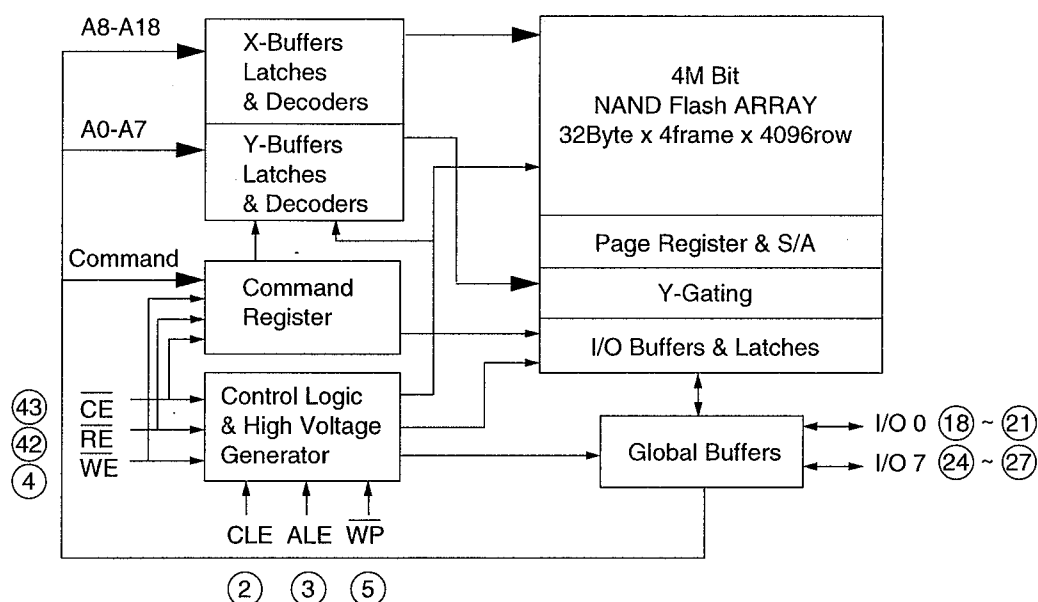
EXPLANATION OF IC TERMINALS (Base Unit)

IC401: PQVIMX93002F



PIN DESCRIPTION

Pin NO.	Name	Description
1	CP	the Output of Internal PLL Charge Pump Circuits
2	PVDD	Digital Power ; 5V Power Supply for Internal PLL Charge Pump Circuits
3	VCOMP	the Reference Voltage for POW and BAT 2 Comparators use
4	POWB	Power-down Detector Output (Active Low)
5	VPOW	Power-down Detector Input ; the Voltage is Divided from System DC Power for Compare with VCOMP ; with 7 V Surge Protect
6	BATB	Battery Detector Output (Active Low)
7	VBAT	Battery Detector Input ; the Voltage is Divided from Battery Power for Compare with VCOMP ; with 7 V Surge Protect
8	LOUTP	Telephone Line Driver Non-inverter Output with PGA ; PGA from 0 to 22.5 dB / step ; 1.5 dB / step ;
9	LOUTN	Telephone Line Inverter Output with PGA ; see the pin description about LOUTP
10	AVDD	Analog Power Supply ; 5 V Power for all Internal Analog circuits
11	AGND	Analog Ground ; Ground Reference (OV) for all Internal Analog circuits
12	VBG	Band Gap Reference ; Nominal 1.25 V and should not be used to Sink or Source current
13	AG	Internal Analog Ground ; Nominal 2.25 V and should not be used to Sink or Source Current
14	VREF	Voltage Reference ; Nominal 2.25 V and can sink 450uA
15	MIC	Microphone Input with PRE-PGA ; PRE-PGA Gain is from -15 to 21 dB ;
16	LIN	Telephone Line Signal Input with PRE-PGA and AD2-PGA ; PRE-PGA Gain is from -15 to 21 dB and AD2-PGA Gain is from -6 to 39 dB ;
17	AUX1	1.Auxiliary Signal Input with PRE-PGA ; 2. as an Output port for AIN2 (AD2 Input)
18	PGAC1	Programmable Gain Amplifier Offset Capacitor
19	ALCRC	Auto Level Control Time Constant ; see BASIC COMPONENTS REQUIRED
20	ALCC1	Auto Level Control DC Blocking Capacitor Output
21	ALCC2	Auto Level Control DC Blocking Capacitor Input
22	FILT	1. Anti-aliasing Filter ; 2. as an I / O Port for AIN1(AD1 Input)
23	PGAC2	Programmable Gain Amplifier Offset Capacitor
24	LPFC1	1. the Option of the External Passive L.P.F. for LIN_DRV and SPK_DRV , if LPFC1 and LPFC2 pins are NC then the signal will by-pass L.P.F. ; 2. as the Output Port of AOUT1 ; where 3 dB point : $f_c = 1 / 2 \Omega \ 3K\Omega (\pm 10\%) \ C14 \text{ or } C13$
25	LPFC2	the Option of the External Passive L.P.F. ; see the pin description about LPFC1
26	AUX2	as an Input / Output Port for SWK and SWH
27	VR	Speaker Volume Control ; use a 10k Variable / Fixed Resistor for External / Digital Volume
28	SVDD1	Analog Power Supply ; 5V Power for Speaker Driver
29	SPKP	Speaker Driver Non-inverter Output with PGA ; PGA Gain from 0~18 dB ; it's can be Attenuated by ATT2 (VR1) or ATT1 (REG3 bit (3~0)) ; see NOTE5 and NOTE6
30	SGND	Analog Ground ; Ground Reference (OV) for Speaker Driver
31	SPKN	Speaker Driver Inverter Output ; see the pin description about SPKP
32	SVDD2	Analog Power Supply ; 5 V Power for Speaker Driver
33	SDENB	Serial Data Enable ; Active Low ; for start to Receive / Transmit Serial Control Data (A2~D0)
34	SDATA	Bi-directional Serial Port ; It's an Interface for Microprocessor to send / receive Serial Control Data
35	SCLK	Serial Control Data Clock ; the clock source of Serial Control Data ; from Microprocessor
36	DX1	Transmit Data 1 Pin (CODEC1 Serial Data)
37	DR1	Receive Data 1 Pin (CODEC1 Serial Data)
38	DX2	Transmit Data 2 Pin (CODEC2 Serial Data)
39	DR2	Receive Data 2 Pin (CODEC2 Serial Data)
40	FS	CODEC Frame Sync. ; 8KHz Frame Sync. Clock for the Transmit / Receive Data
41	MCLK	Master Clock Input , if MCLK is continuously high or low then MX93002 will into Power-Down Mode
42	VDD	Digital Power ; 5 V Power Supply for all Internal Digital Logic
43	DGND	Digital Ground ; Ground Reference (0 V) for all Internal Digital Logic
44	PGND	Digital Ground ; Ground Reference (0 V) for Internal PLL Charge Pump Circuits

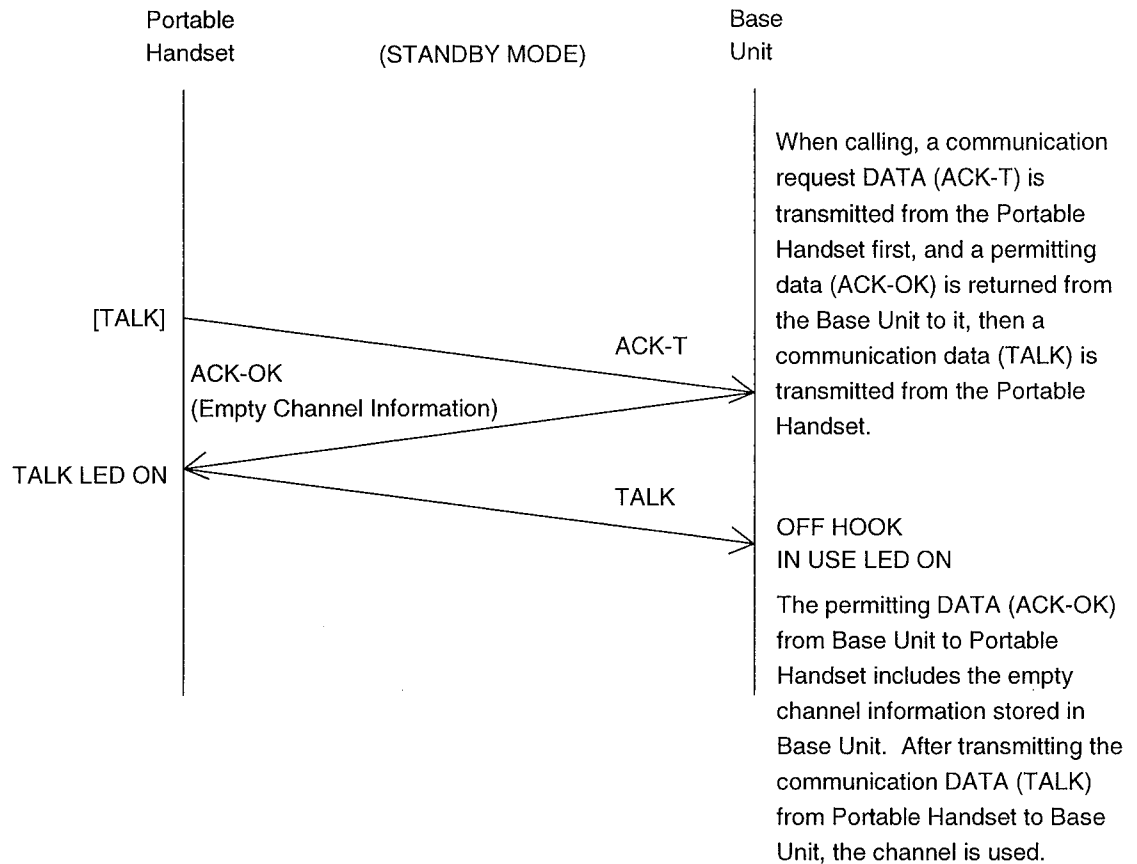


● Pin Description

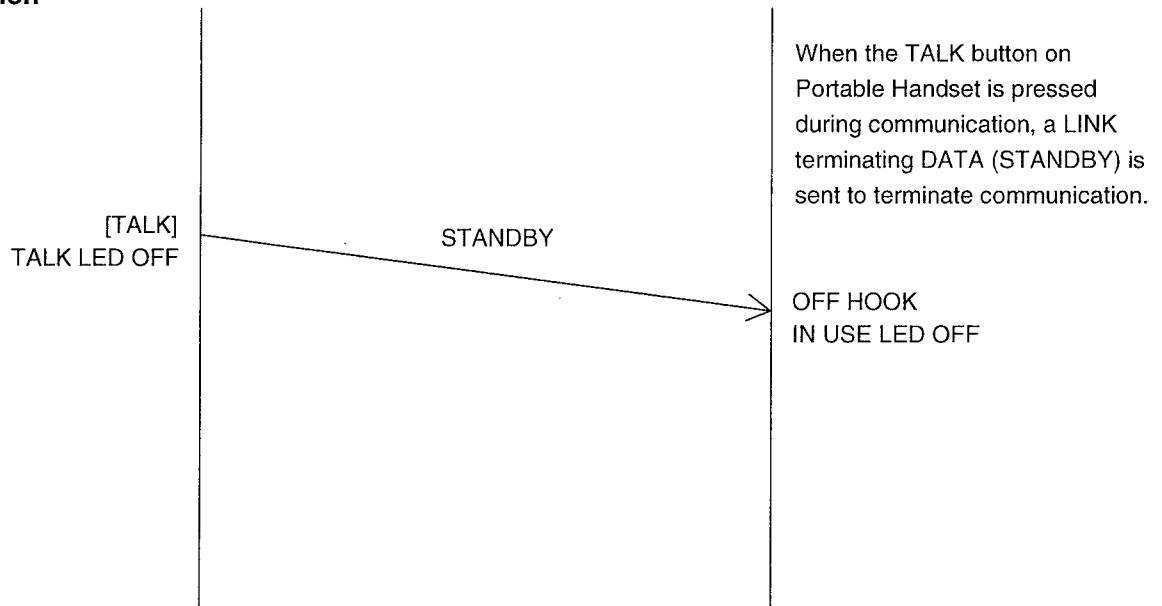
Pin No.	Name	Description
2	CLE	The CLE input controls the path activation for commands sent to the command register. When active high, commands are latched into the command register through the I/O ports on the rising edge of the WE signal.
3	ALE	The ALE input controls the path activation for address and input data to the internal address/data registers. Addresses are latched on the rising edge of WE with ALE high, and input data is latched when ALE is low.
4	$\overline{\text{WE}}$	The WE input controls writes to the I/O port. Commands, address and data are latched on the rising edge of the WE pulse.
5	$\overline{\text{WP}}$	The WP pin provides inadvertent write/erase protection during power transitions. The internal high voltage generator is reset when the WP pin is active low.
18~21 24~27	I/O 0~I/O 7	The I/O pins are used to input command, address and data, and to output data during read operations. The I/O pins float to high-z when the chip is deselected or the outputs are disabled.
41	R/ $\overline{\text{B}}$	The R/B output indicates the status of the device operation. When low, it indicates that a program, erase or frame access in read operation is in process and return to high state upon completion. It is an open drain output and does not float to high-z condition when the chip is deselected or outputs are disabled.
42	$\overline{\text{RE}}$	The RE input is the sequential data-out control, and when active drives the data onto the I/O bus. Data is valid REA after the falling edge of RE which also increments the internal column address counter by one.
43	$\overline{\text{CE}}$	The CE input is the device selection control. When CE goes high during a read operation the device is returned to standby mode. However, when the device is in the busy state during program or erase, CE high is ignored, and does not return the device to standby mode.

EXPLANATION OF CPU DATA COMMUNICATION

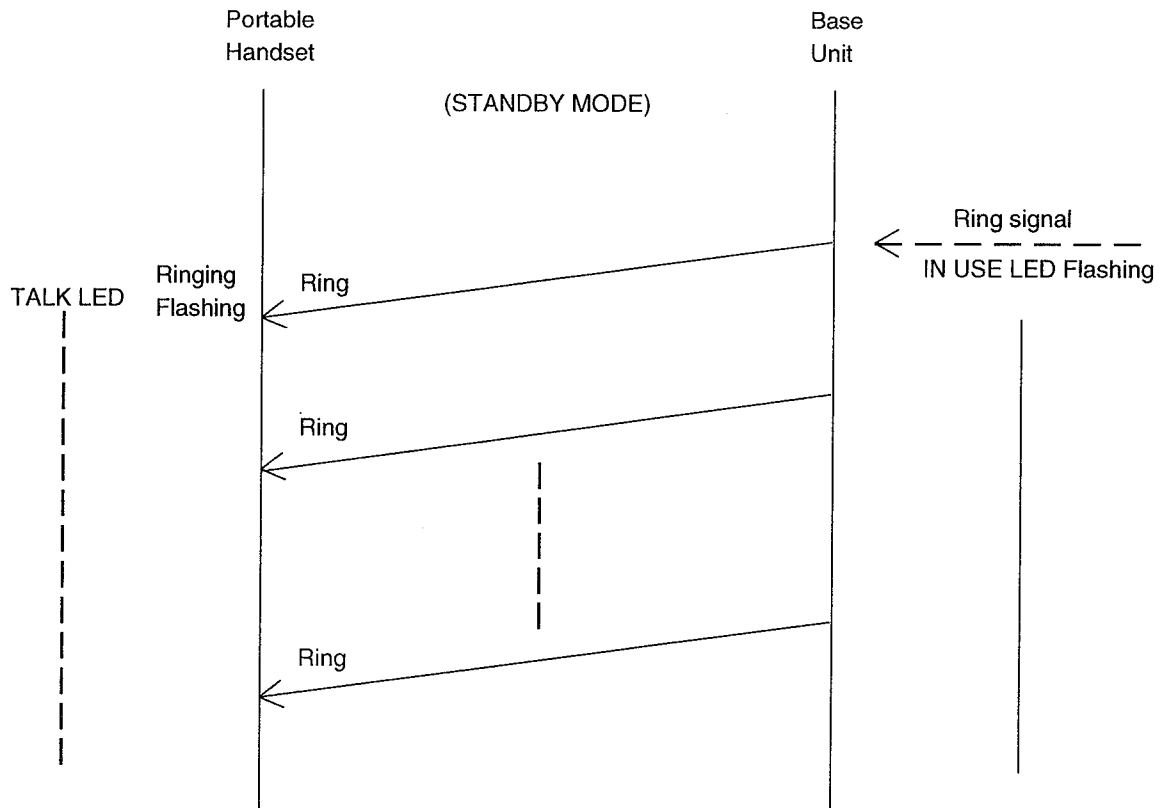
1. Calling



2. To terminate Communication



3. Ringing



After detecting the Ring signal from circuit, Base Unit sends a ring signal DATA (Ring), then the Portable Handset starts ringing.

4. Ports for transmitting and receiving of data

Portable Handset : transmitting ... 11 Pin receiving ... 12 Pin

Base Unit : transmitting ... 17 Pin receiving ... 22 Pin

5. Waveform of DATA used for cordless transmission and reception

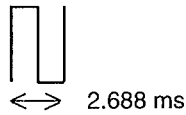
The DATA which is transmitted from the Portable Handset to the Base Unit is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data.

The DATA which is transmitted from the Base Unit to the Portable Handset is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data.

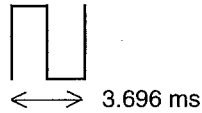
PORTABLE HANDSET

Transmitting DATA Format

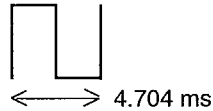
DATA 0



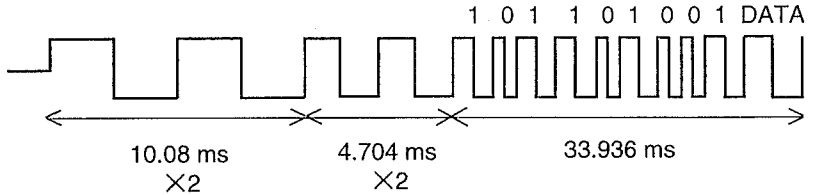
DATA1



DATA Delimt



Pre data



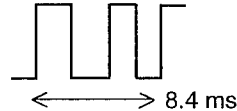
1 0 1 1 0 1 0 0 1 DATA

4.704 ms X2

33.936 ms

63.504 ms

END data



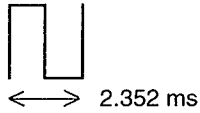
BASE UNIT

Transmitting DATA Format

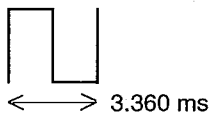
DATA 0



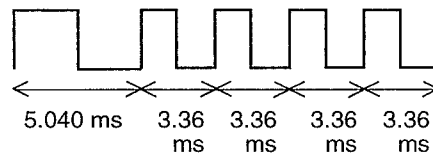
DATA1



DATA Delimt

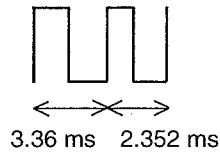


Pre data



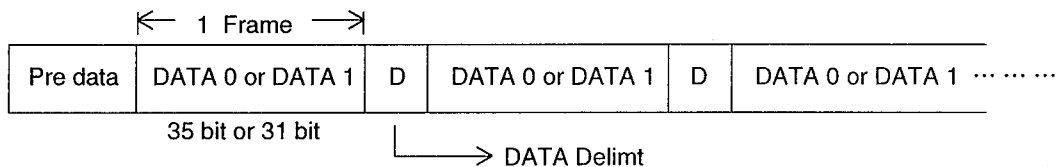
18.48 ms

END data



5.712 ms

6. When LINKing

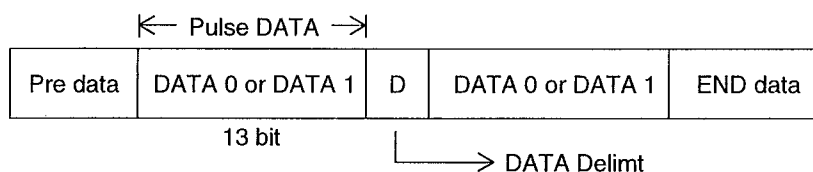


When LINKing from the Portable Handset (when becoming STBY to TALK), DATA is transmitted in above format. The combined portion of DATA 0 and DATA 1 is transmitted in LINK requesting DATA (35bit) format first. Then, when LINK OK (ACK-OK) DATA (19bit) is returned from the Base Unit, it is sent as LINK from DATA after changing the combination of DATA 0 and DATA 1. And the DATA Delimt is between each Frame as a stop.

The contents of LINK requesting DATA and LINK form DATA are different depending on each operation.

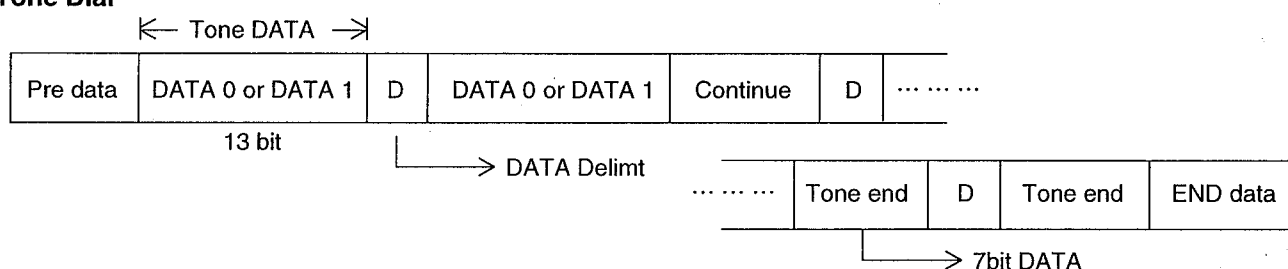
KX-TCM939-B/KX-TCM941-B

7. Pulse Dial



When executing Pulse Dial, the Pulse Dial DATA is transmitted from the Portable Handset to the Base Unit in above format. The combination of DATA 0 and DATA 1 are changed by each Dial No. And the DATA Delimt is between each Frame as a stop. The number of Frame is 2.

8. Tone Dial



When executing Tone Dial, Tone Dial DATA is transmitted from the Portable Handset to the Base Unit in above format. The DATA is changed by Dial No. as same as Pulse Dial. When Tone Dialing, DATA (Continue DATA) that the key is pressed continuously is sent to the Base Unit during the key is pressed. When depressing the key, the TONE Dial exterminating DATA (Tone end DATA) is send, and the END data is sent finally.

NOTE

1,000,000 kinds of the security code are available for the model KX-TCM939-B/KX-TCM941-B. Each time the portable handset is set on the cradle of the base unit (for charging), the CPU automatically change the security code.

FREQUENCY TABLE (MHz)

CH	Base Unit TX Portable Handset RX	Base Unit RX Portable Handset TX	CH	Base Unit TX Portable Handset RX	Base Unit RX Portable Handset TX
1	902.100 MHz	926.100 MHz	16	902.850 MHz	926.850 MHz
2	902.150 MHz	926.150 MHz	17	902.900 MHz	926.900 MHz
3	902.200 MHz	926.200 MHz	18	902.950 MHz	926.950 MHz
4	902.250 MHz	926.250 MHz	19	903.000 MHz	927.000 MHz
5	902.300 MHz	926.300 MHz	20	903.050 MHz	927.050 MHz
6	902.350 MHz	926.350 MHz	21	903.100 MHz	927.100 MHz
7	902.400 MHz	926.400 MHz	22	903.150 MHz	927.150 MHz
8	902.450 MHz	926.450 MHz	23	903.200 MHz	927.200 MHz
9	902.500 MHz	926.500 MHz	24	903.250 MHz	927.250 MHz
10	902.550 MHz	926.550 MHz	25	903.300 MHz	927.300 MHz
11	902.600 MHz	926.600 MHz	26	903.350 MHz	927.350 MHz
12	902.650 MHz	926.650 MHz	27	903.400 MHz	927.400 MHz
13	902.700 MHz	926.700 MHz	28	903.450 MHz	927.450 MHz
14	902.750 MHz	926.750 MHz	29	903.500 MHz	927.500 MHz
15	902.800 MHz	926.800 MHz	30	903.550 MHz	927.550 MHz

HOW TO REPLACE FLAT PACKAGE IC

■ PREPARATION

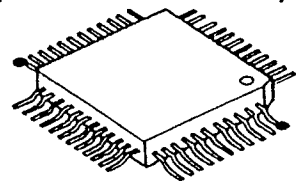
- SOLDER - - - - - Sparkle Solder 115A-1, 115B-1
OR
Almit Solder KR-19, KR-19RMA
- Soldering iron - - - - - Recommended power consumption will be between 30 W to 40 W.
Temperature of Copper Rod 662 ± 50°F (350 ± 10°C)

(An expert may handle 60~80 W iron, but beginner might damage foil by overheating.)
- Flux - - - - - HI115 Specific gravity 0.863

(Original flux will be replaced daily.)

■ PROCEDURE

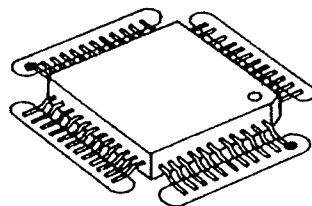
1. Temporary fix FLAT PACKAGE IC by soldering on two marked 2 pins.



● - - - - - Temporary soldering point.

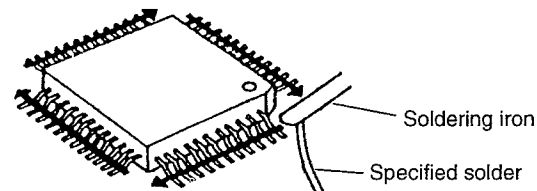
*Most important matter is accurate setting of IC to the corresponding soldering foil.

2. Apply flux for all pins of FLAT PACKAGE IC.



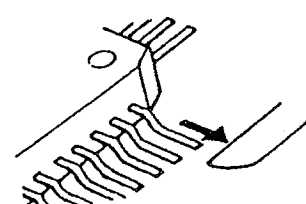
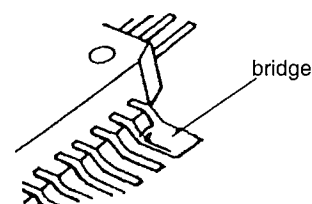
○ - - - - - Flux

3. Solder employing specified solder to direction of arrow, as sliding the soldering iron.

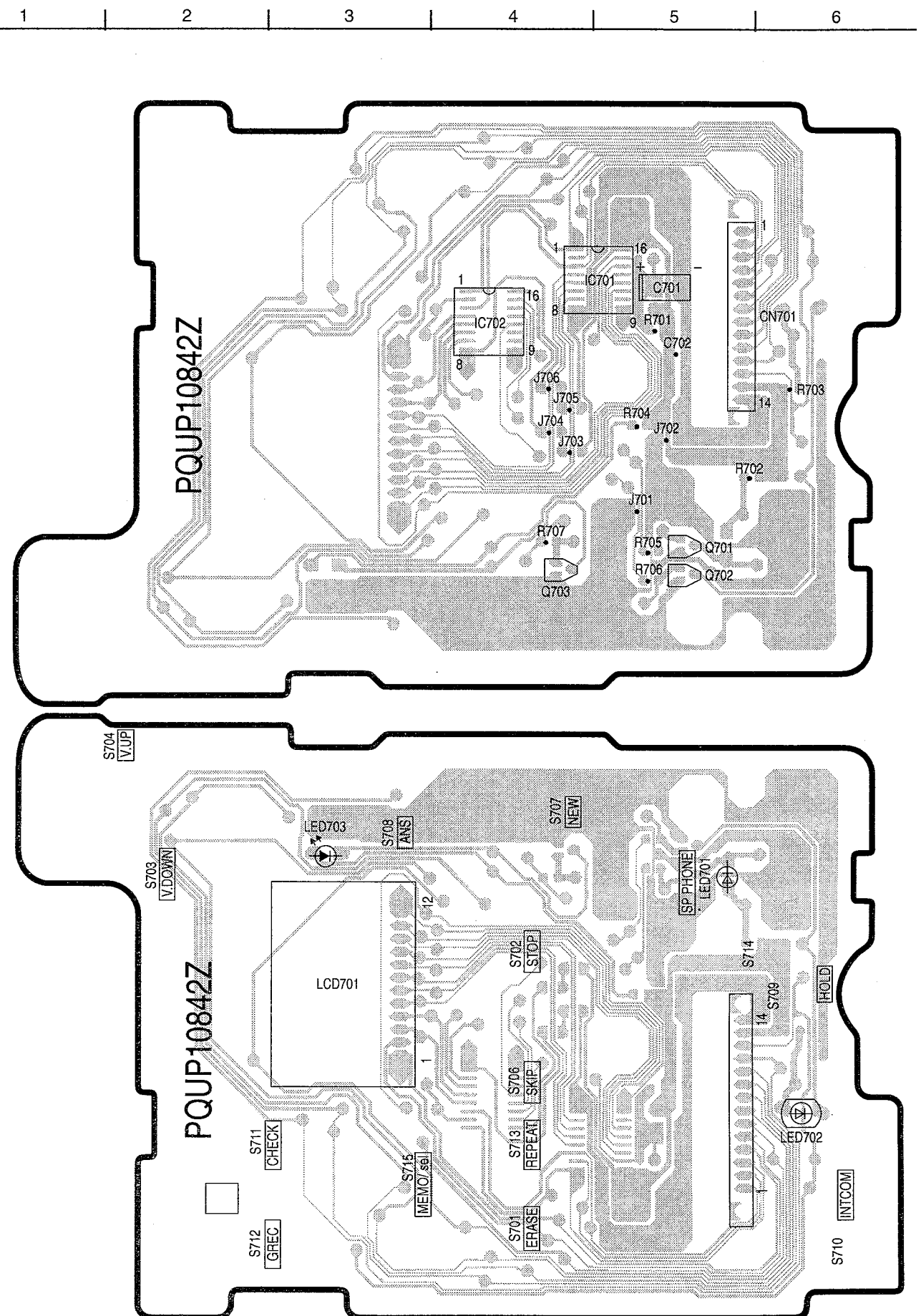


■ MODIFICATION PROCEDURE OF BRIDGE

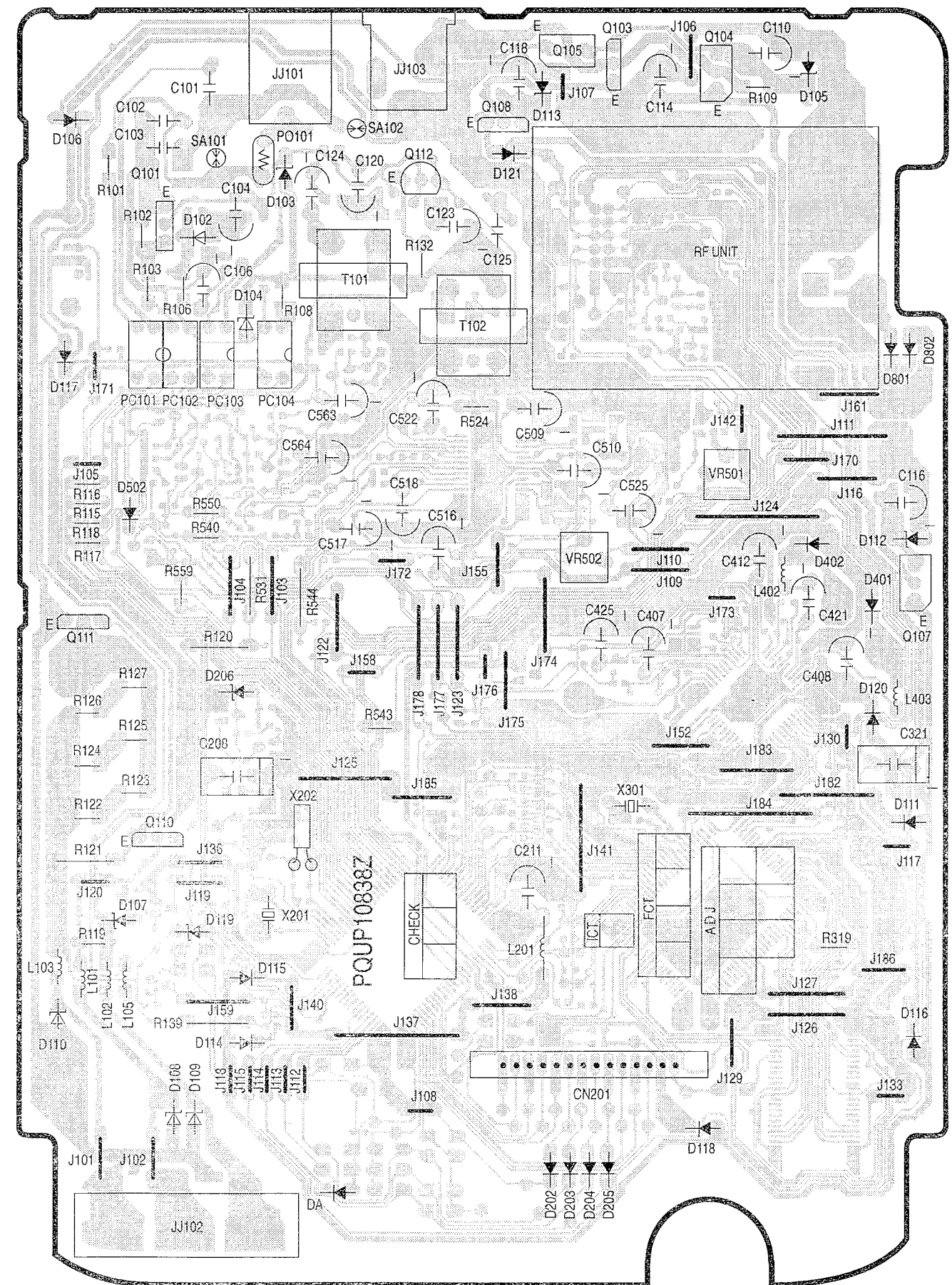
1. Re-solder slightly on bridged portion.
2. Remove remained solder along pins employing soldering iron as shown in below figure.

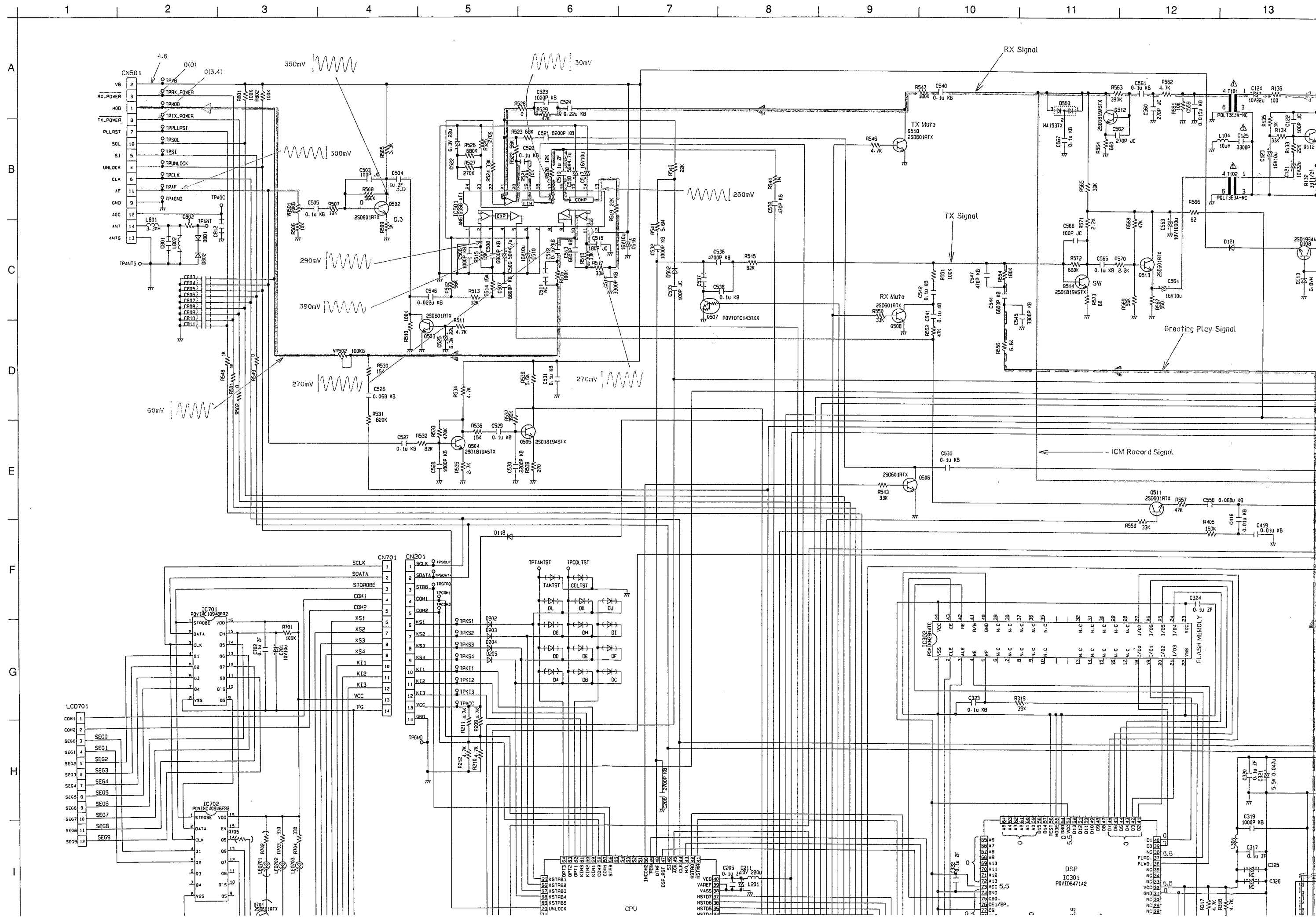


CIRCUIT BOARD (Base Unit) [OPERATIONAL P.C.BOARD]



1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

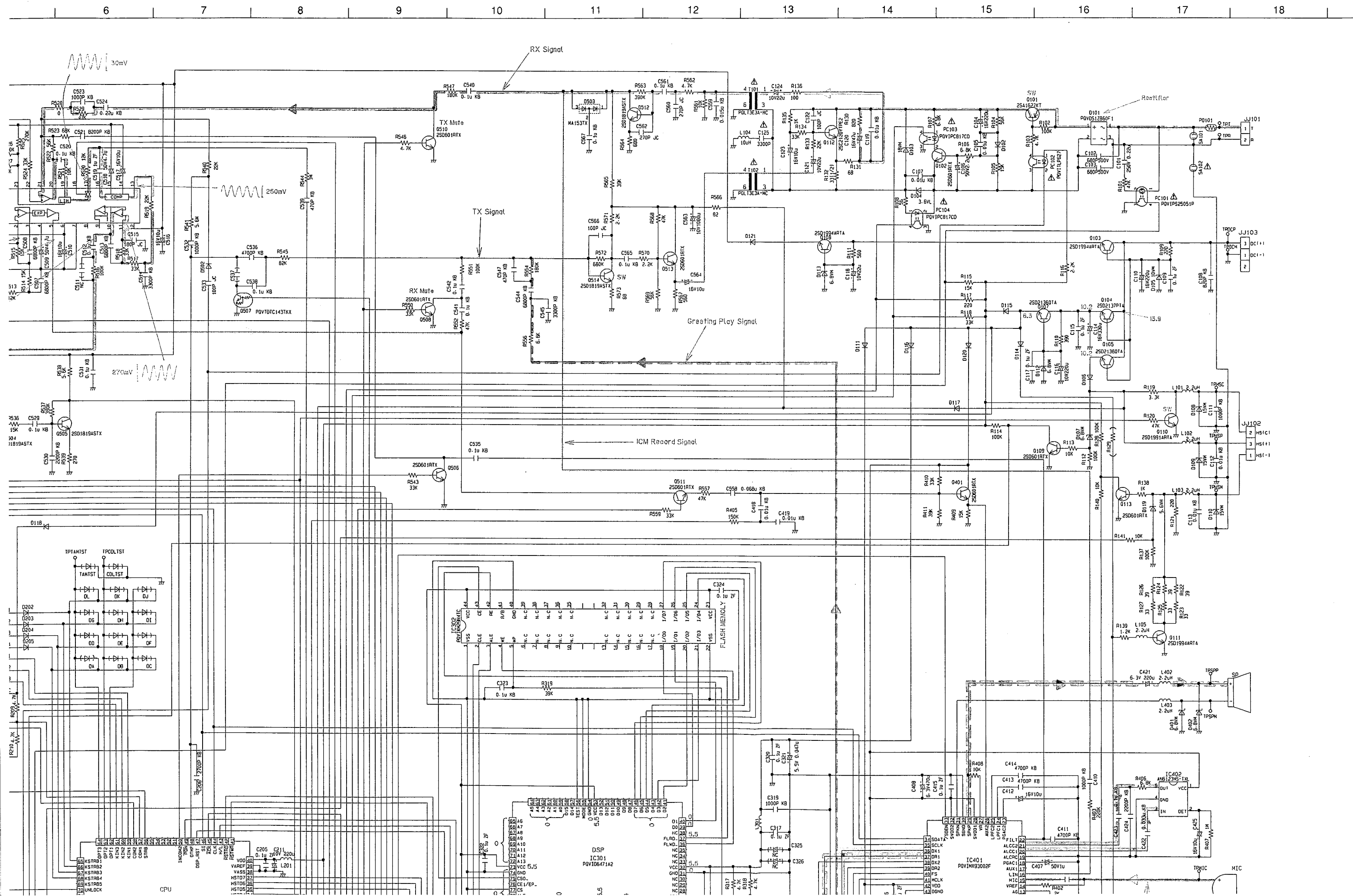


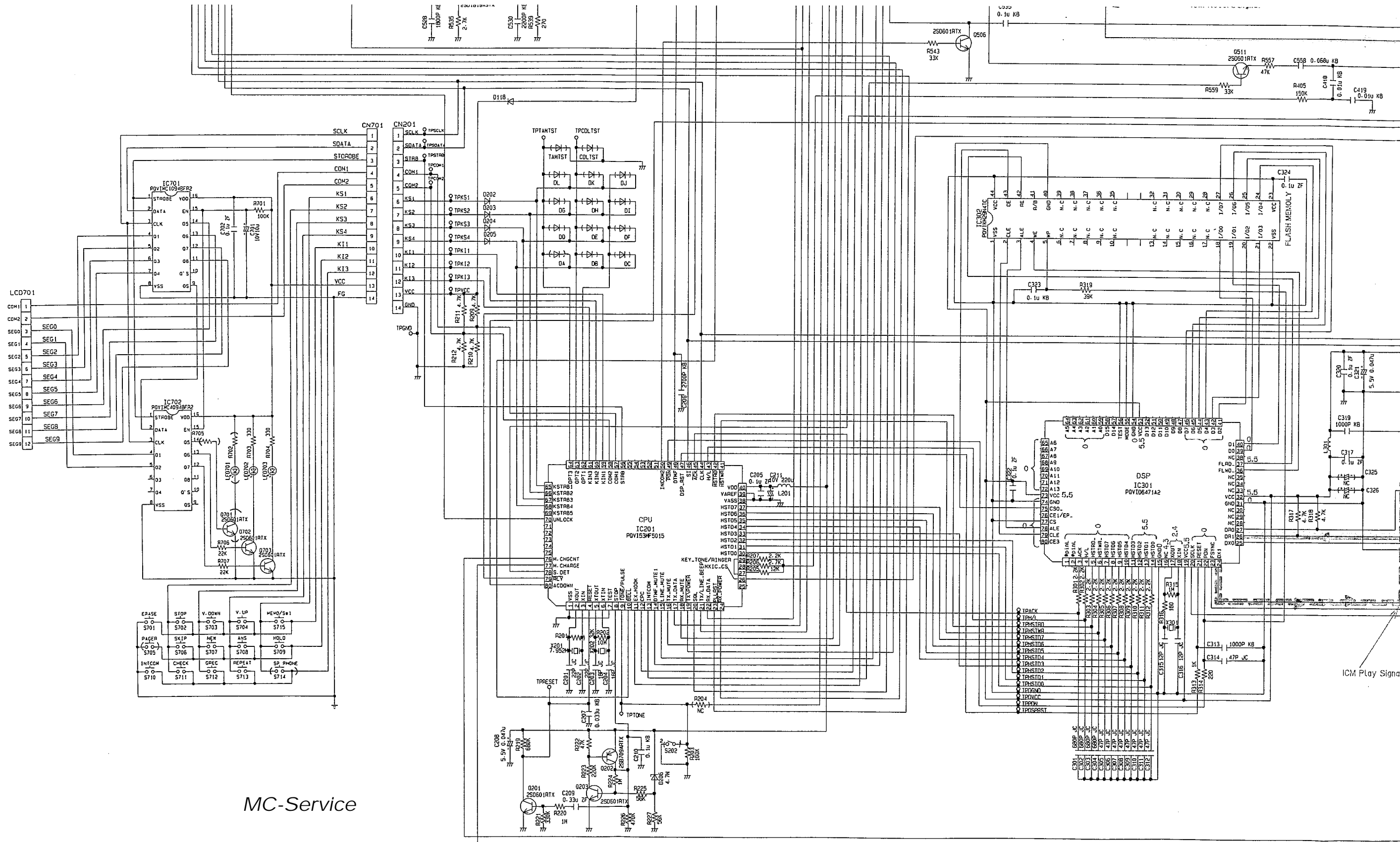


SCHEMATIC DIAGRAM (Base Unit)

MC-Service

KX-TCM939-B/KX-TCM941-B





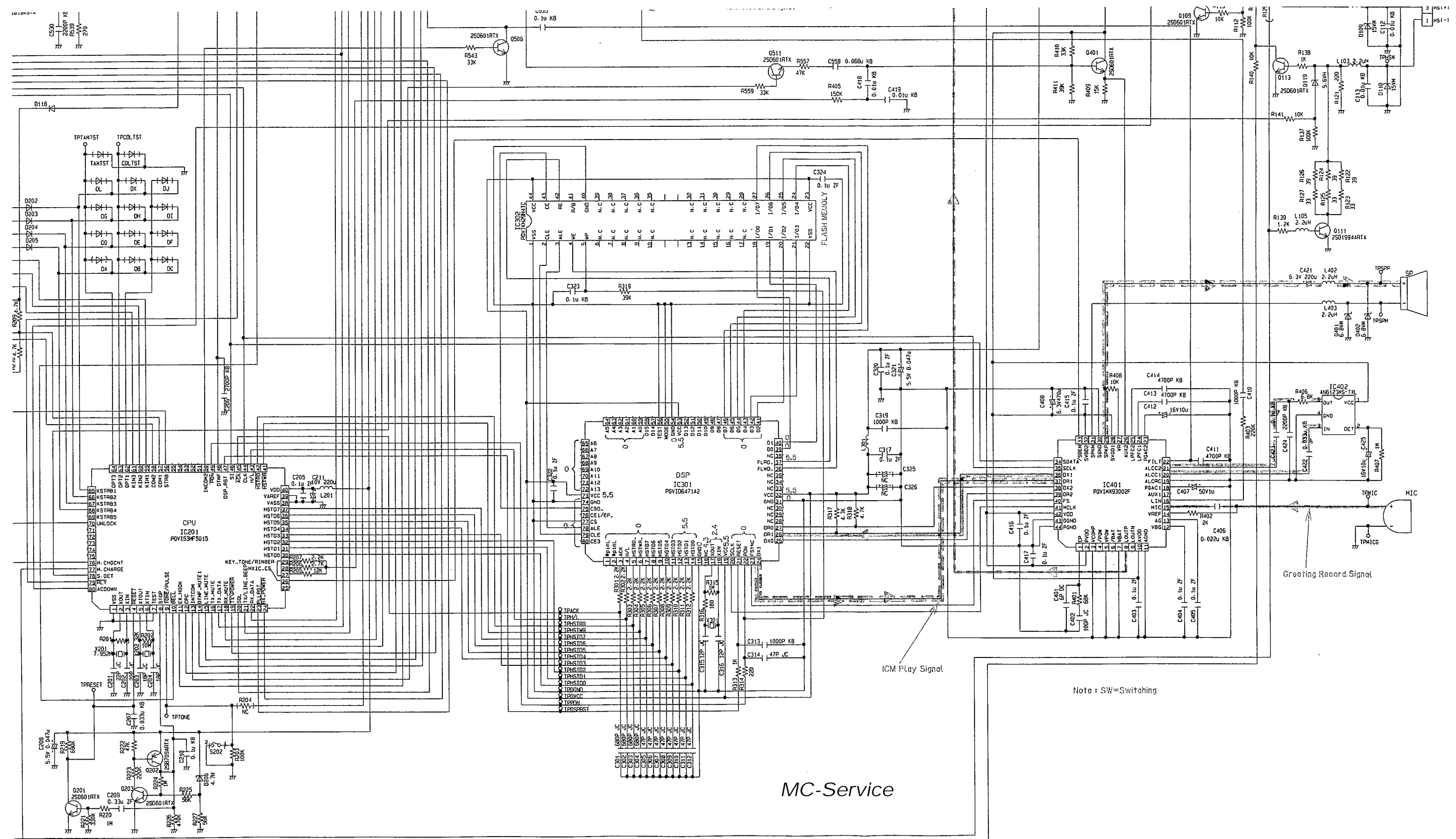
Notes:

1. S701: Erase Switch
2. S702: Stop Switch
3. S703: Volume (Down) Switch
4. S704: Volume (Up) Switch
5. S706: Skip/FF Switch
6. S707: New Message Switch
7. S708: Answer On Switch
8. S709: Hold/Ringer Switch
9. S710: Locator/Intercom Switch
10. S711: Greeting Check Switch

11. S712: Greeting Record switch
12. S713: Repeat/Rew Switch
13. S715: Memo Switch
14. DC voltage measurements are taken with voltmeter from the negative voltage line.

Important Safety Notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

This schematic diagram may be modified at any time with the development of new technology.

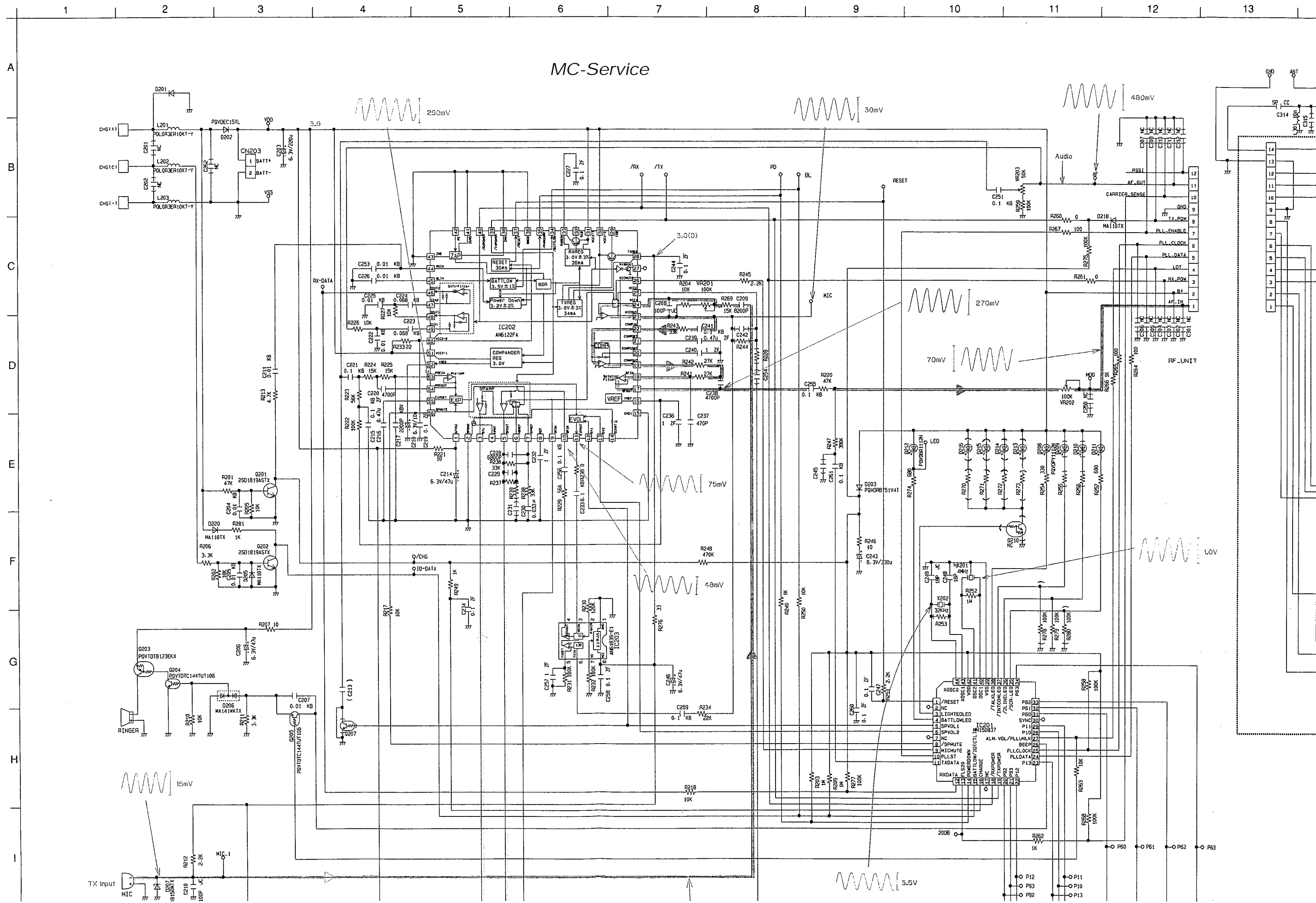


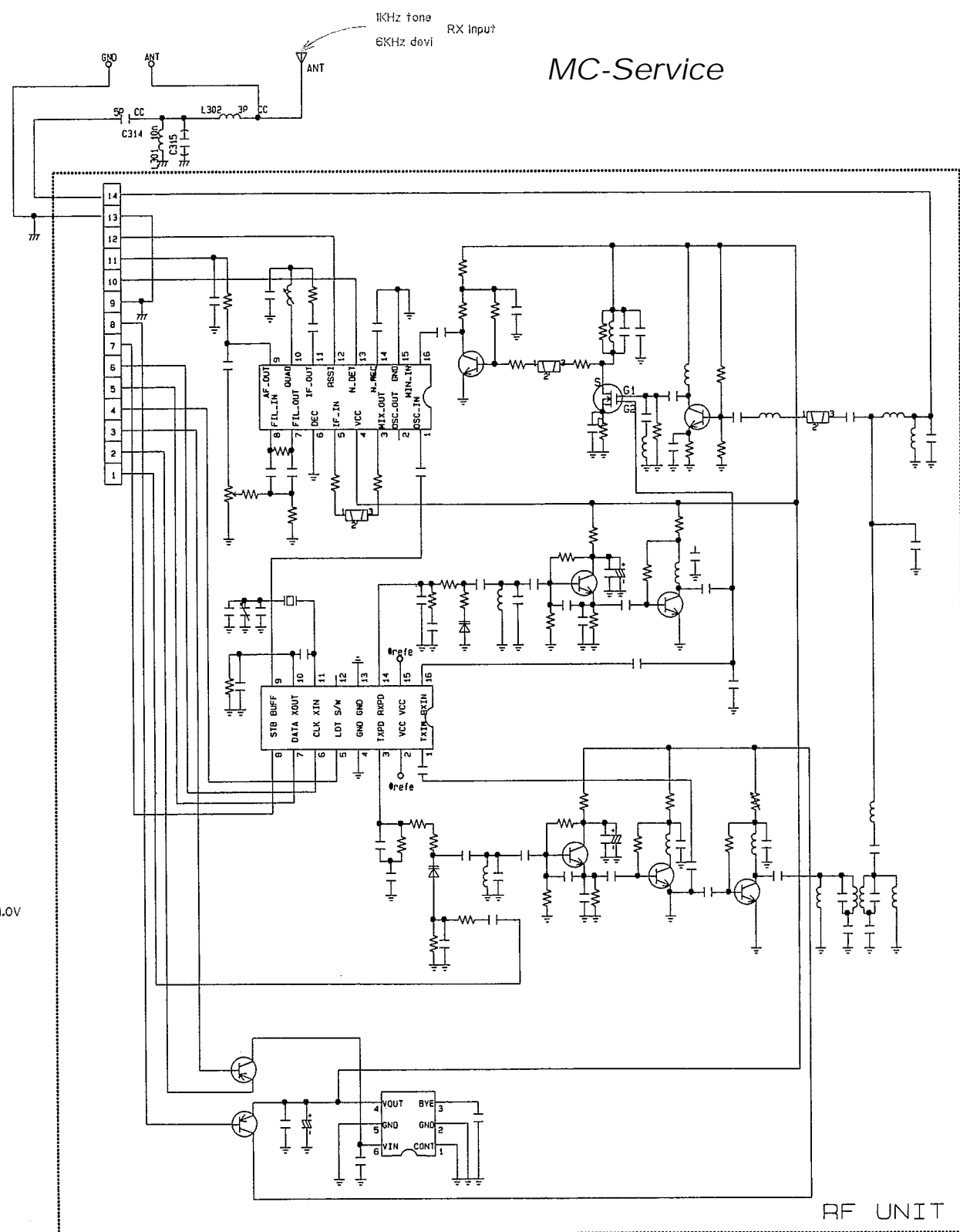
MC-Service

Greeting Record switch
Repeat/Rew Switch
Memo Switch
tage measurements are taken
trometer from the negative voltage line.

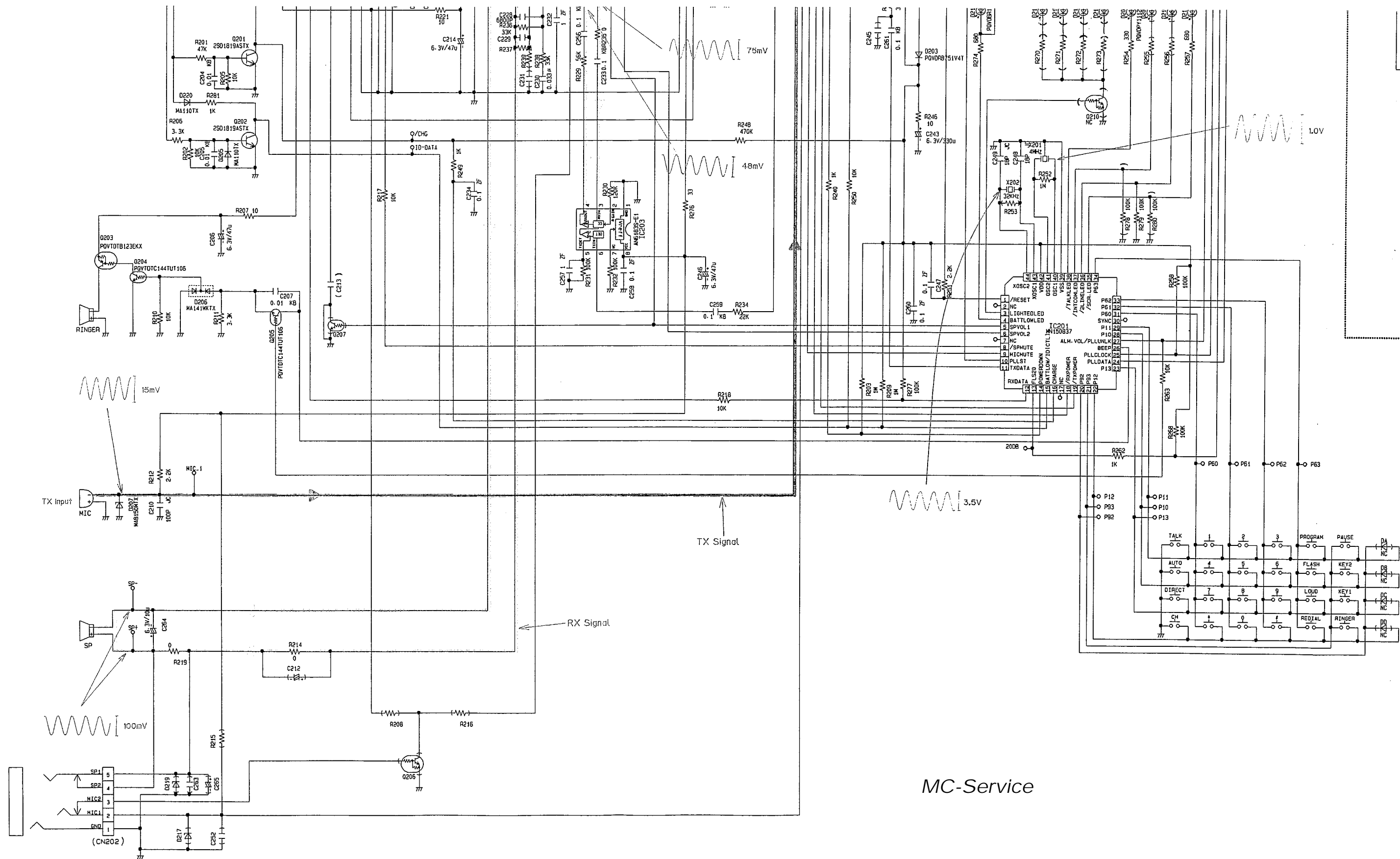
Important Safety Notice:
Components identified by Δ mark have special characteristics
important for safety. When replacing any of these components, use
only manufacturer's specified parts.

This schematic diagram may be
modified at any time with the
development of new technology.





RF UNIT

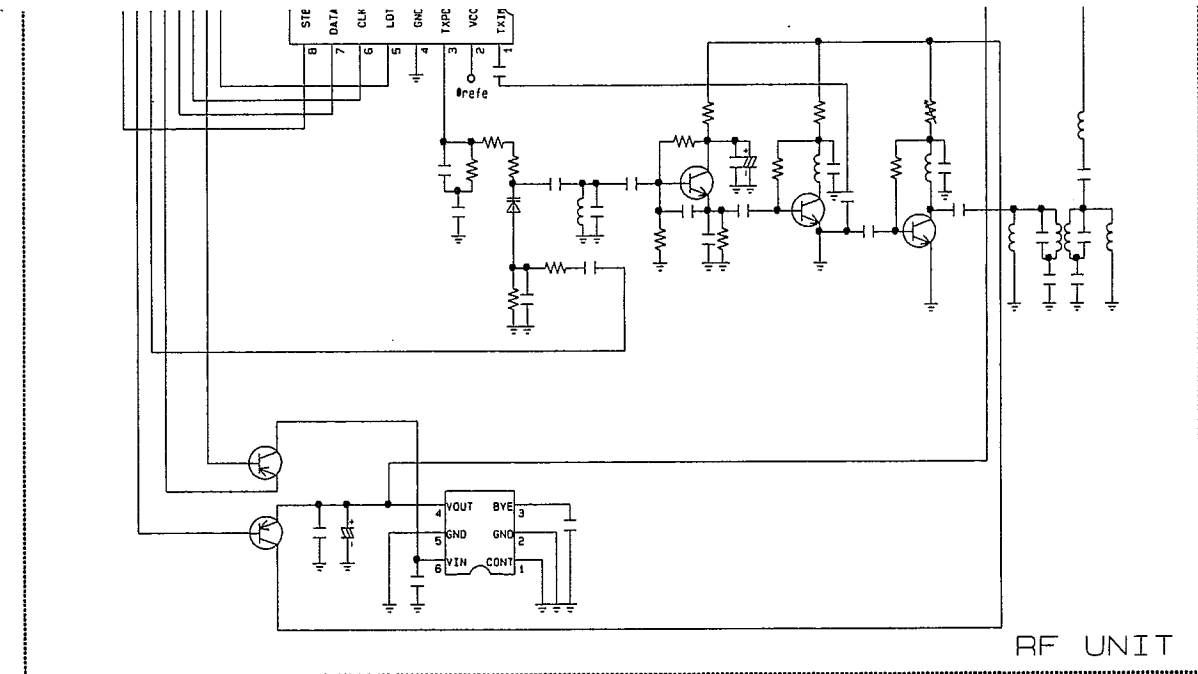


MC-Service

Note:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

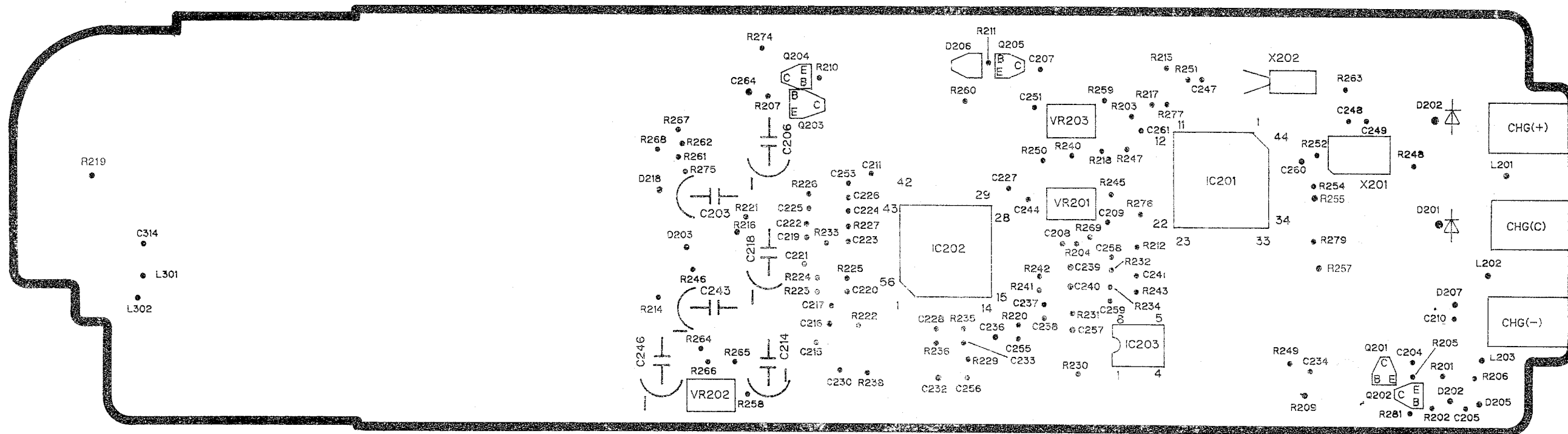
This schematic diagram may be modified at any time with the development of new technology.



RF UNIT

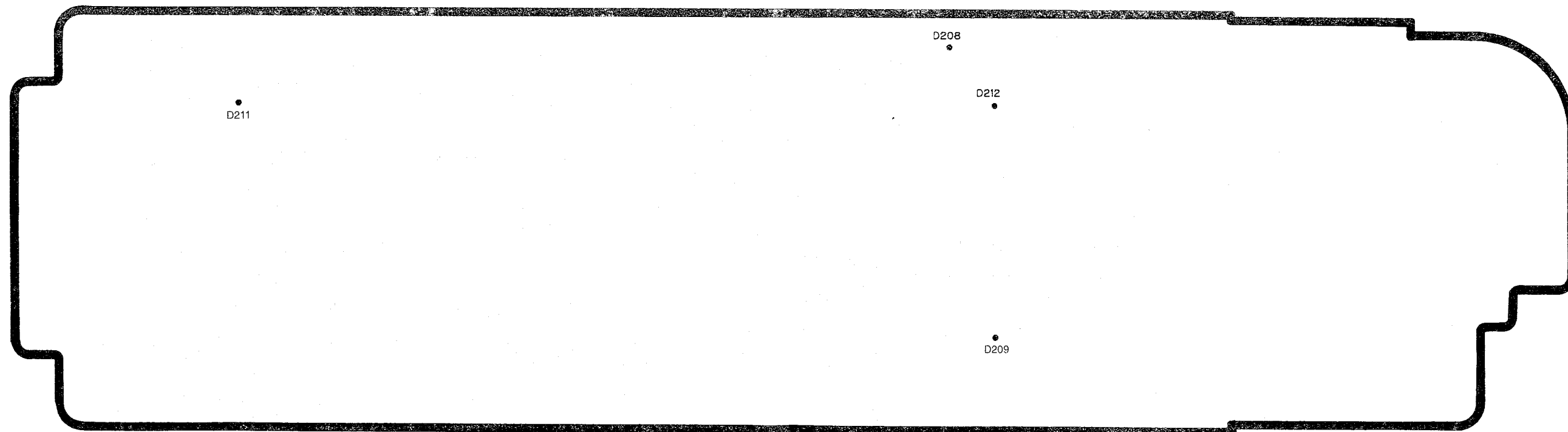
CIRCUIT BOARD (Portable Handset)

(Flow Solder Side View)



(Component View)

MC-Service



NEW CIRCUIT OPERATION (Base Unit)



(IC301, IC302 and IC401) is a digital speech/signal processing system that implements all the functions of speech compression, record and playback, and memory management required in a digital telephone answering machine.

The DSP system comprises of following.

- a Digital Signal Processor which includes the firmware implemented functions.
- a Codec (IC401), which is used as the analog I/O interface.
- a FLASH MEMORY (IC302), which is used for stored voice messages and synthesized voice.

```
graph LR; HP[Host Processor IC201] <--> DSP[DSP IC301]; DSP <--> AIO[Analog I/O IC401]; DSP <--> FM[FLASH MEMORY IC302]; AIO --> AI[Audio In]; AO[Audio Out] --> AIO; HP --> AIO;
```

The diagram illustrates the system architecture. It features a central DSP (IC301) connected to a Host Processor (IC201) via a bidirectional bus. The DSP is also connected to an Analog I/O (IC401) block and a FLASH MEMORY (IC302) block via bidirectional buses. The Analog I/O block has two external connections: Audio In and Audio Out. A direct connection also exists from the Host Processor to the Analog I/O block.

The DSP system use a proprietary speech compression technique to record and store voice message in FLASH MEMORY (IC302). An error correction algorithm is used to enable playback of these messages from the FLASH MEMORY (IC302).

The DTMF detection is implemented by the DSP system in software. The DTMF detection is performed during Record, Playback, and Line Monitoring modes of operation.

The DSP implements synthesized Voice, utilizing the built in speech detector and an FLASH MEMORY (IC302), which stored the vocabulary.

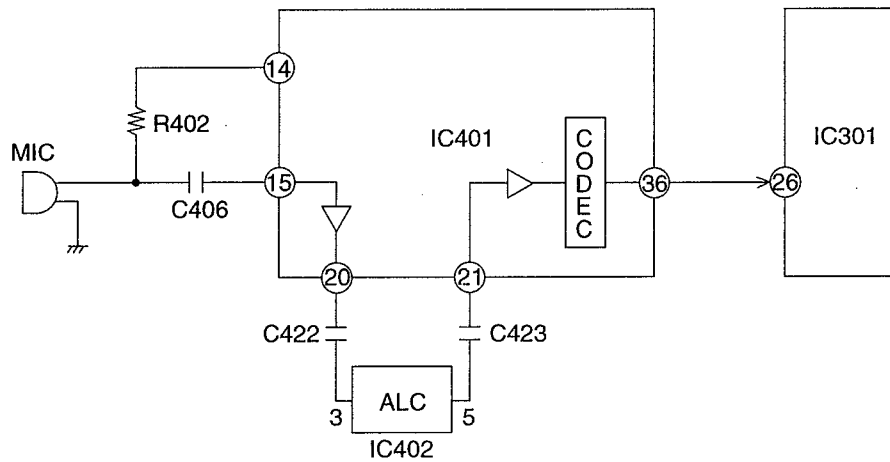
The VOX detection is implemented by the DSP system in software.
The VOX detection is performed during ICM Record mode of operation.

■ GREETING RECORDING CIRCUIT

Circuit Operation:

MIC → C406 → pin ⑮ of IC401 → pin ⑳ of IC401 → pin ③ of IC402 → pin ⑤ of IC402 → pin ㉑ of IC401
→ pin ㉓ of IC301 → pin ㉔ of IC301.

Circuit Diagram

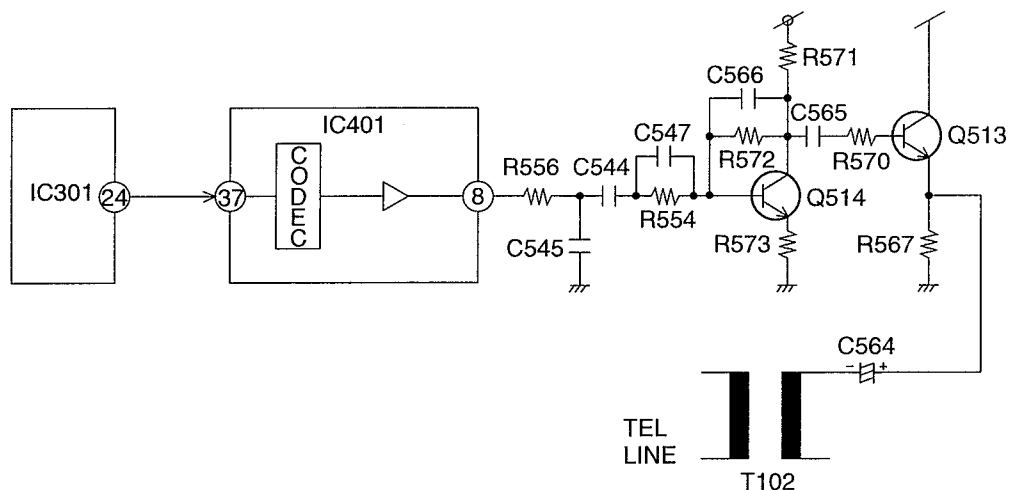


■ GREETING PLAY BACK CIRCUIT

Circuit Operation:

Pin ㉔ of IC301 → pin ㉗ of IC401 → pin ⑧ of IC401 → R556 → C544 → R554 → base of Q514 → collector of Q514
→ C565 → R570 → base of Q513 → emitter of Q513 → C564 → T102 → TEL LINE.

Circuit Diagram

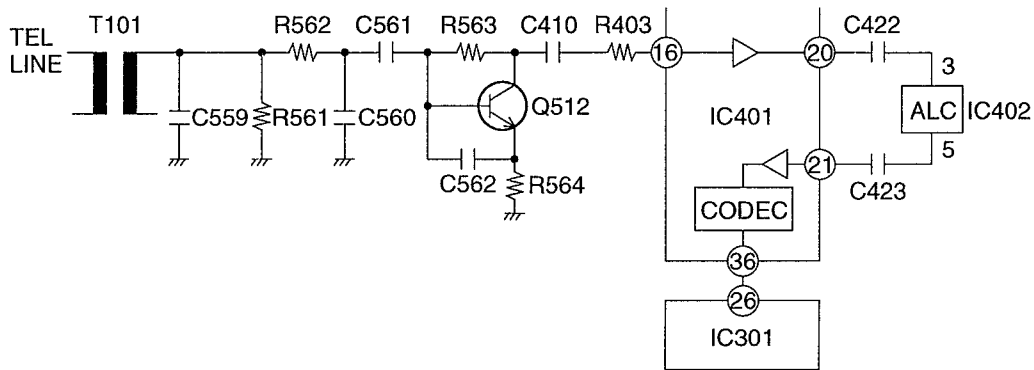


■ ICM RECORDING CIRCUIT

Circuit Operation:

TEL LINE → T101 → R562 → C561 → Collector of Q512 → C410 → R403 → pin ①⑥ of IC401 → pin ②① of IC401 → C422 → pin ③ of IC402 → pin ⑤ of IC402 → C423 → pin ②① of IC401 → pin ③⑥ of IC401 → pin ②⑥ of IC301.

Circuit Diagram

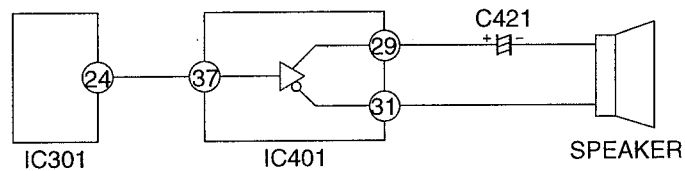


■ ICM PLAY CIRCUIT

Circuit Operation:

Pin ②④ of IC301 → pin ③⑦ of IC401 → pin ②⑨ and ③① of IC401 → C421 → Speaker.

Circuit Diagram



NORMAL CIRCUIT OPERATION (Base Unit)

TELEPHONE LINE INTERFACE

Circuit Operation:

● ANSWER

In the idle mode, Q101 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:

T → PO101 → PC101 → IC201 pin ⑩ .

When the CPU detects a ring signal, Q101 turns on, thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the voice signal.

T → PO101 → D101 → Q101 → T101 pin ① → T101 pin ③ → D104 → D101 → R

● ON HOOK

Q101 is open, Q101 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

● SPECIFICATIONS

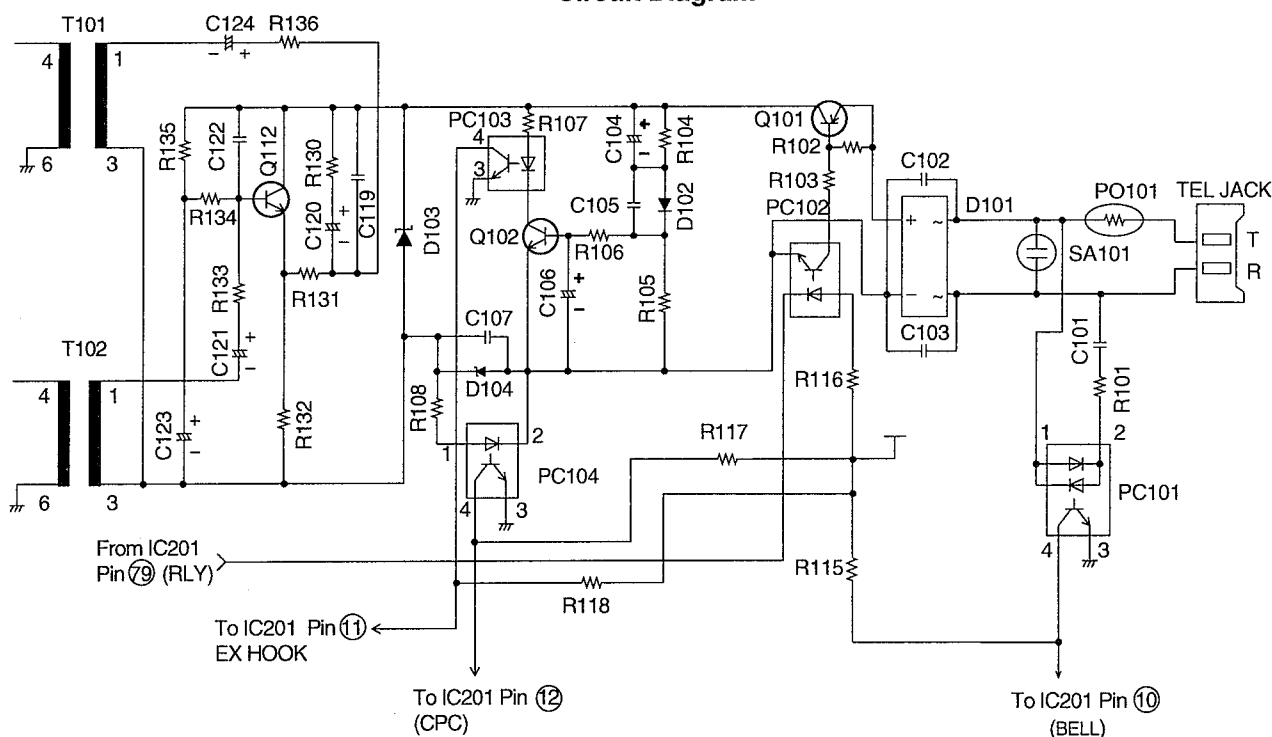
In the on-hook state (idle), the current flows between the telephone line and the unit is as follows:

T → PO101 → PC101 → R101 → C101 → R

The DC component is blocked by C101: thereby providing an on-hook condition.

The AC interface impedance is over 47 kΩ; thus, satisfying the telephone company requirements.

Circuit Diagram

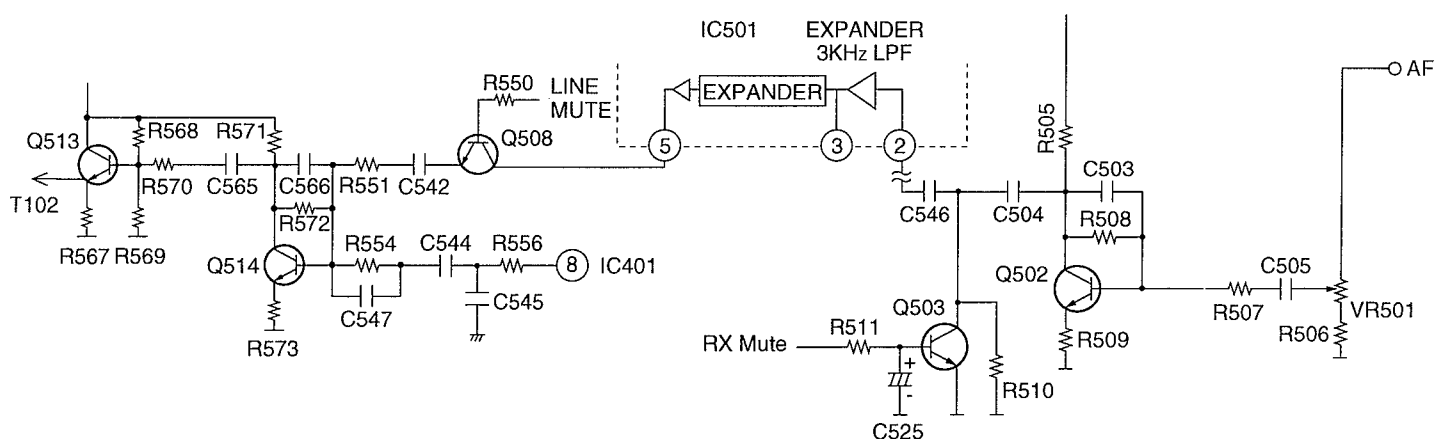


■ INTERCOM MODE

- 1) When the base unit LOCATOR/INTERCOM button is pressed, a call monitor signal (intercom sound) is output from pin ②⑦ of IC201 becomes "LOW". Thus a monitor tone is heard from the speaker.
- 2) At the same time, pin ①⑨ of IC201 goes "Low", and the transmission state is reached. Then the modulated data signal is output from pin ①⑦ of IC201. Flashing of the IN USE/CHARGE (LED702) is obtained from pin ①③ of IC702. This status is called "Intercom stand-by".
- 3) The receiving signal flows:
 RF → pin ①① of CN501 → VR501 → Q502 → C504 → R513 → pin ② of IC501 → pin ⑤ of IC501 → collector of Q511 → emitter of Q511 → R557 → C558 → base of Q401 → emitter of Q401 → pin ②⑥ of IC401 → pin ②⑨ and ③① of IC401 → Speaker.
- 4) The transmission signal flows:
 MIC → pin ①⑤ of IC401 → pin ②② of IC401 → C535 → C521 → R523 → pin ②① of IC501 → pin ②① of IC501 → C520 → R521 → R520 → C519 → pin ①⑥ of IC501 → pin ①③ of IC501 → R519 → pin ①① of IC501 → pin ①① of IC501 → R516 → VR502 → pin ① of CN501 → RF.

■ LINE SENDING SIGNAL

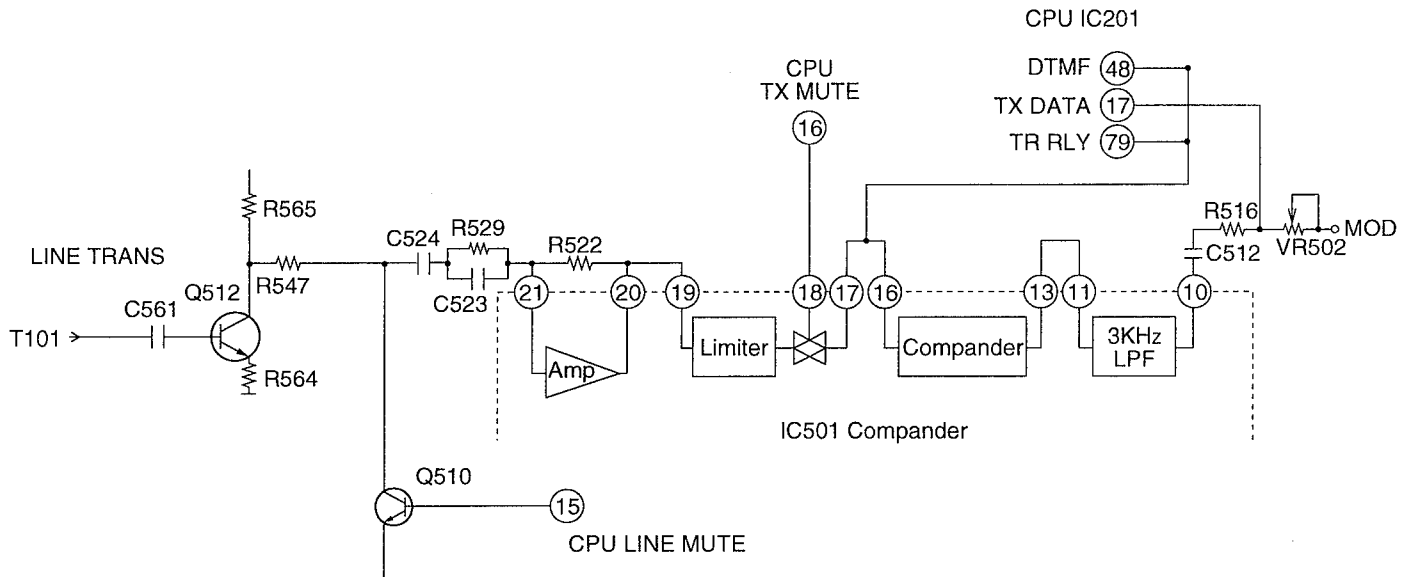
The AF signal output from the AF terminal of the RF unit is adjusted to the appropriate level by VR501, amplified by Q502, and input to IC501. The RX DATA signal from the portable handset is muted at this point by Q502 to prevent the RX DATA from leaking onto the line. IC501 comprises a 3 kHz LPF and an expander IC. The signal compressed by the portable handset is expanded, recreating it as a normal signal. The output from the expander passes through amplifier Q514 and buffer amplifier Q513 before being input to line transformer T102. In the speakerphone mode, the signal is supplied from pin ④ of IC401 to Q514.

Circuit Diagram

LINE RECEIVING SIGNAL

The audio signal from line transformer T101 is amplified by Q512 and input to IC501. IC501 comprises an amplifier, limiter, mute circuit, compander, and 3 kHz LPF. It performs signal processing. The audio signal output from pin ⑩ of IC501 is mixed with the DTMF, TX DATA, and TR RLY signals. At this point (in the talk mode), the DTMF tones, pulse dial tones, and data transferred between the portable handset and base unit is input to the modulator circuit.

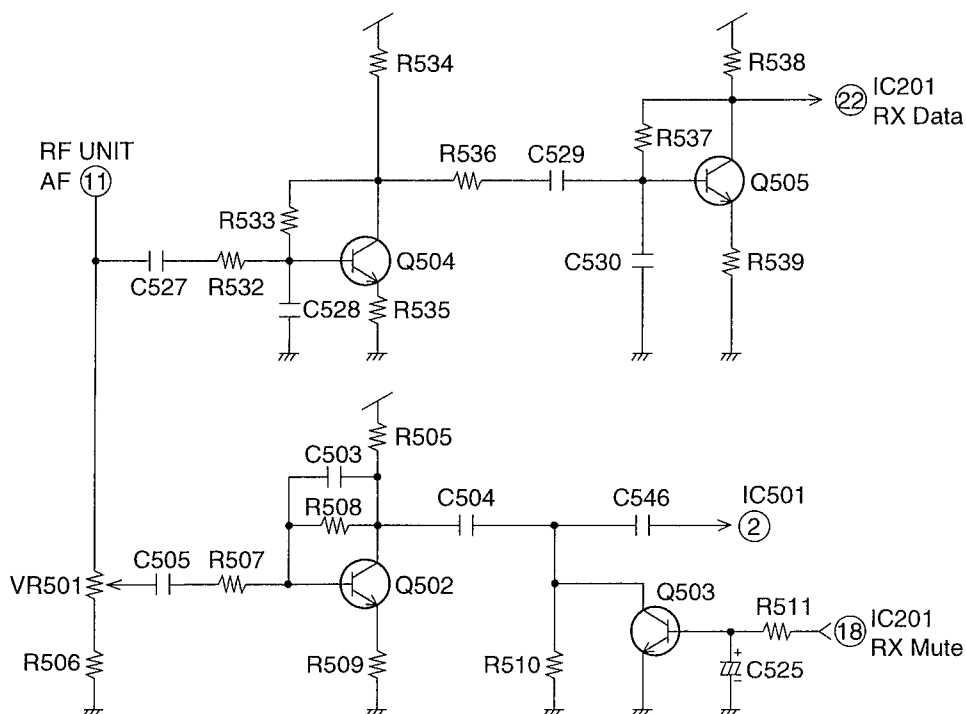
Circuit Diagram



RX DATA CIRCUIT

The resulting demodulated data waveform is then input to RX DATA pin ②② of IC201.

If there is data from the portable handset during talk operation, the portable handset data is as shown below to prevent the data from leaking onto the line.



■ INITIALIZING CIRCUIT

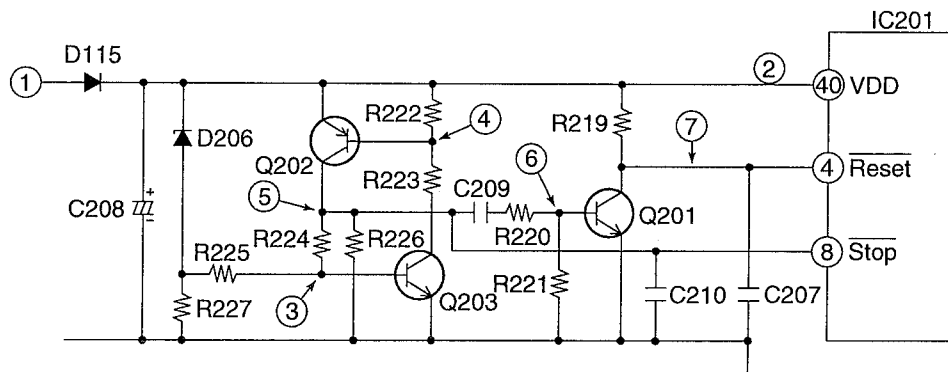
Function:

This circuit is used for to initialize the microcomputer when it incorporates an AC adaptor.

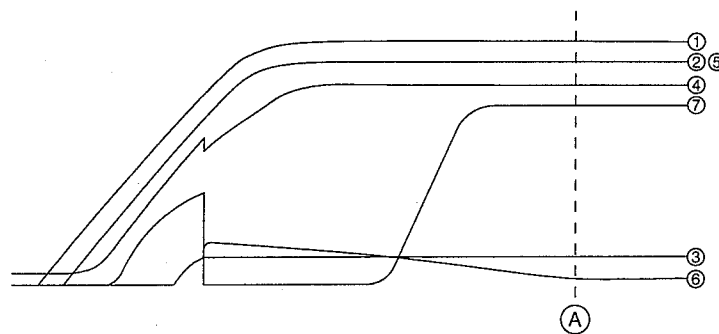
Circuit Operation:

When the AC Adaptor is inserted into the unit, then the voltage is shifted by D115 and power is supplied to the CPU. The set can operate beyond point (A) in the circuit voltage diagram.

Circuit Diagram



Circuit Voltage



■ CPC (CALLING PARTY CONTROL) DETECTOR CIRCUIT

Function:

The CPC DETECTOR complements the units shut off, in the ANSWER mode, after the caller hangs up. At this time, the CPC DETECTOR takes over.

The CPC DETECTOR senses the temporary disconnection of the telephone line which occurs after the caller hangs up.

Circuit Operation:

When off-hook, the DC current of telephone line flows as follows:

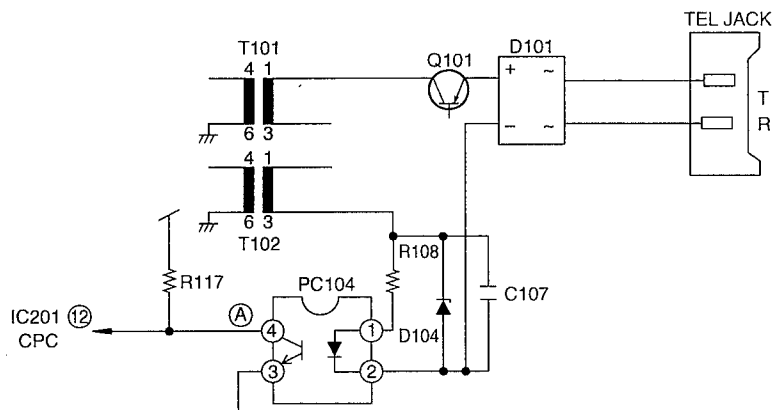
$T \rightarrow D101 \rightarrow T101 \rightarrow T102 \rightarrow R108 \rightarrow PC104 \rightarrow D101 \rightarrow R$

When in the off-hook mode, the collector of PC104 is at Low level.

If an instant break down of the telephone line occurs, the collector of phototransistor goes to a high level from a low level.

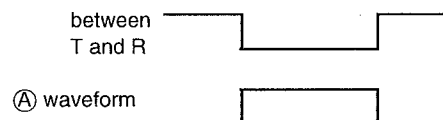
(The CPC detector is designed for the instant break down of more than 8 msec. or 600 msec.)

Circuit Diagram



CPC Function

	A	B
OK	more than 8 ms	more than 600 ms
NG	less than 5 ms	less than 350 ms



■ DTMF SIGNAL

When the DTMF data from the portable unit is received, the DTMF signal is output from pin ④⑧ of the CPU and sent to the line through Q514, Q513.

■ ID CODE SETTING

When the portable handset is placed on the base unit, the charge detector operates and ID data is output from pin ①⑦ of the CPU. After passing through data amplifier Q110 and the charge terminal, the data is sent to the portable handset.

■ AUTO DISCONNECT CIRCUIT

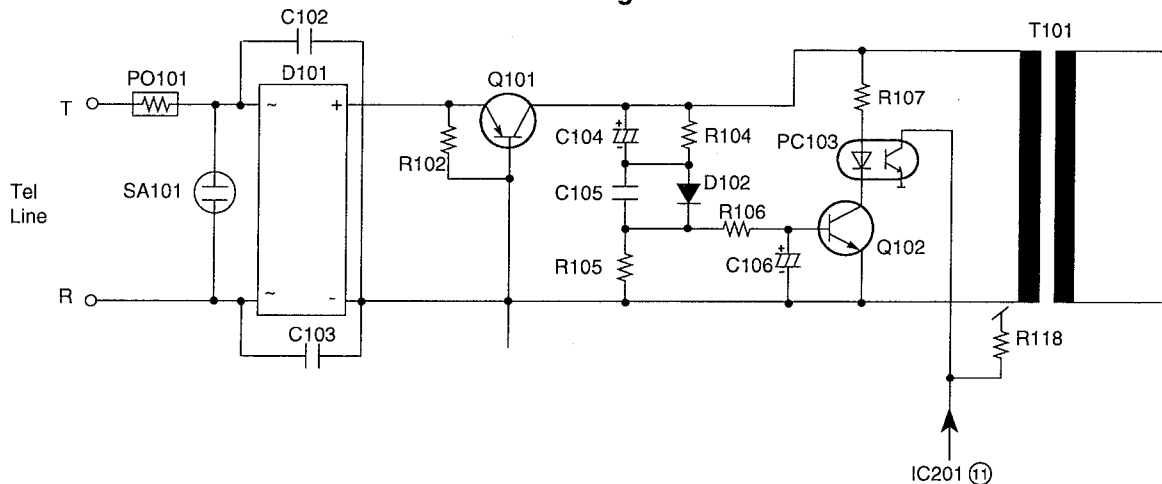
Function:

This circuit is used to detect the fact that another telephone connected to the same line is OFF-HOOK while the unit is in a receiving status or OGM transmitting status.

Circuit Operation:

T → PO101 → D101 → Q101 → C104 → D102 → R106 → Q102. During this interval C106 charges and the base of Q102 becomes High, causing Q102 to go ON. If a parallel-connected telephone is put into an OFF HOOK status, charge ceases to flow to C104, and the base of Q102 becomes Low, causing Q102 to go OFF. However, the system is designed so that if the voltage fluctuation is small, the charging and discharging of C106 has no effect on the system. When a line is connected, Q101 goes ON, causing pin ⑪ of IC201 to go low. When the line is disconnected, Q101 goes off, causing pin ⑪ of IC201 to go high.

Circuit Diagram



■ POWER SUPPLY CIRCUIT

Function:

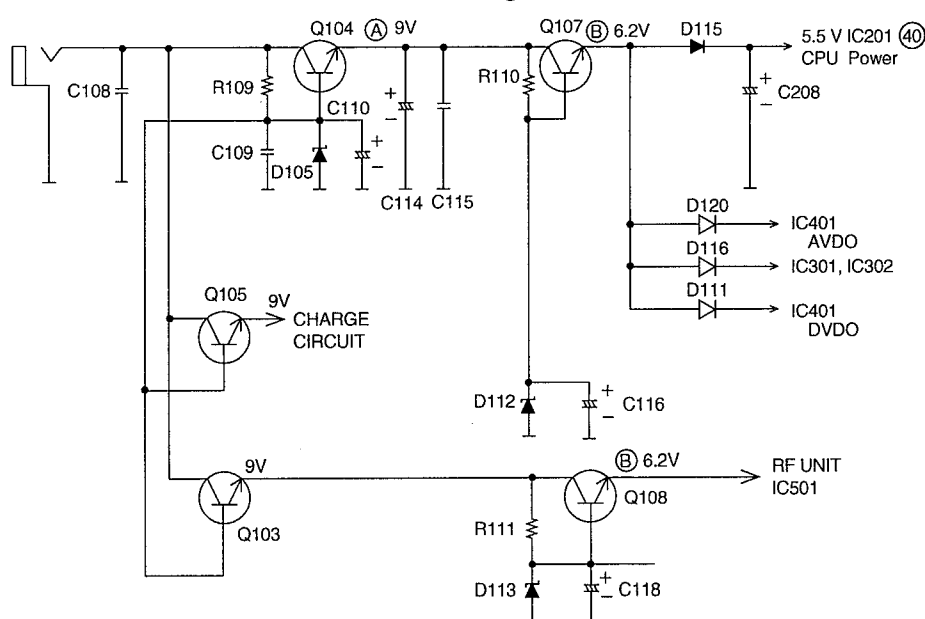
Power from the AC adaptor passes through a 5-stage regulating block consisting of Q103 ~ Q105, Q107 and Q108 and provides system voltages of 9 V and 6.2 V.

Circuit Operation:

Q103 ~ Q105 is a regulated power supply. The voltage at point (A) is regulated to 9 V by the zener voltage of D105. Q107, Q108 is a regulated power supply.

The voltage at point (B) is regulated to 6.2 V by the zener voltage of D112 and D113. The 6.2 V voltage is dropped by D111, D115, D116 and D120 to 5.5 V.

Circuit Diagram



NORMAL CIRCUIT OPERATION (Base Unit)

TELEPHONE LINE INTERFACE

Circuit Operation:

● ANSWER

In the idle mode, Q101 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:

T → PO101 → PC101 → IC201 pin ⑩ .

When the CPU detects a ring signal, Q101 turns on, thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the voice signal.

T → PO101 → D101 → Q101 → T101 pin ① → T101 pin ③ → D104 → D101 → R

● ON HOOK

Q101 is open, Q101 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

● SPECIFICATIONS

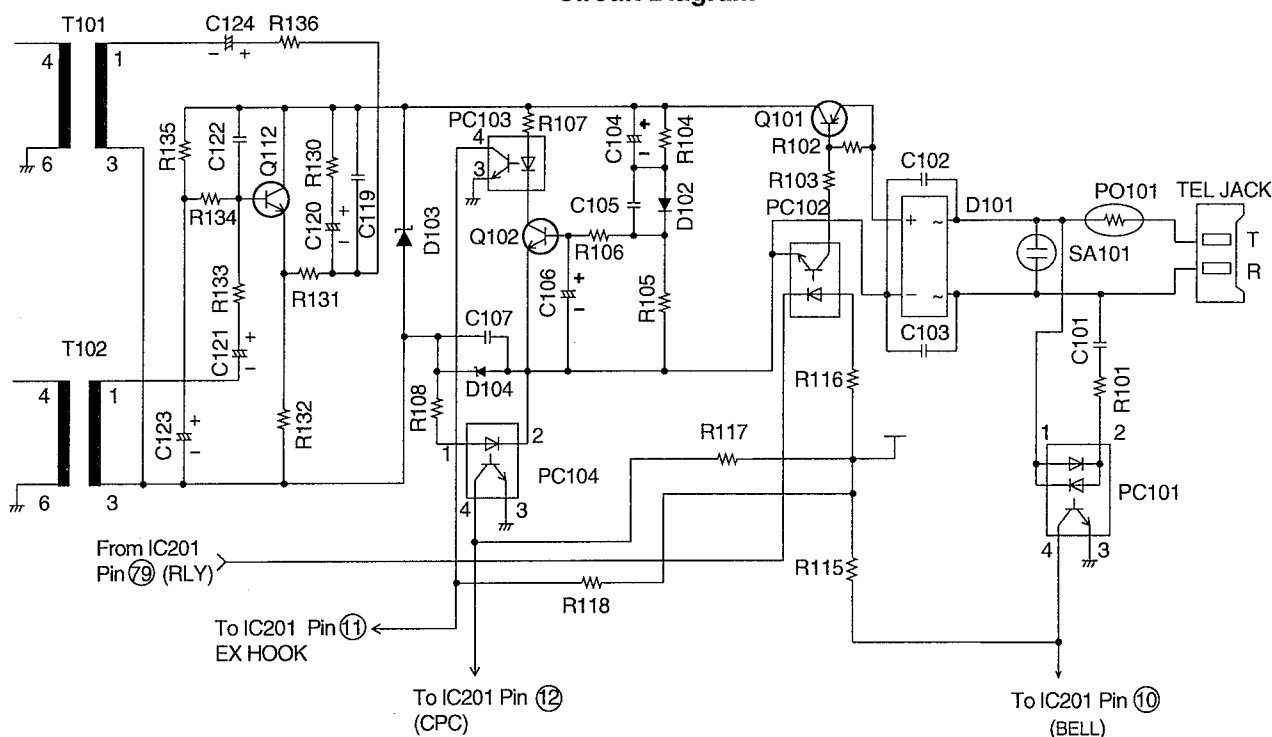
In the on-hook state (idle), the current flows between the telephone line and the unit is as follows:

T → PO101 → PC101 → R101 → C101 → R

The DC component is blocked by C101: thereby providing an on-hook condition.

The AC interface impedance is over 47 kΩ; thus, satisfying the telephone company requirements.

Circuit Diagram



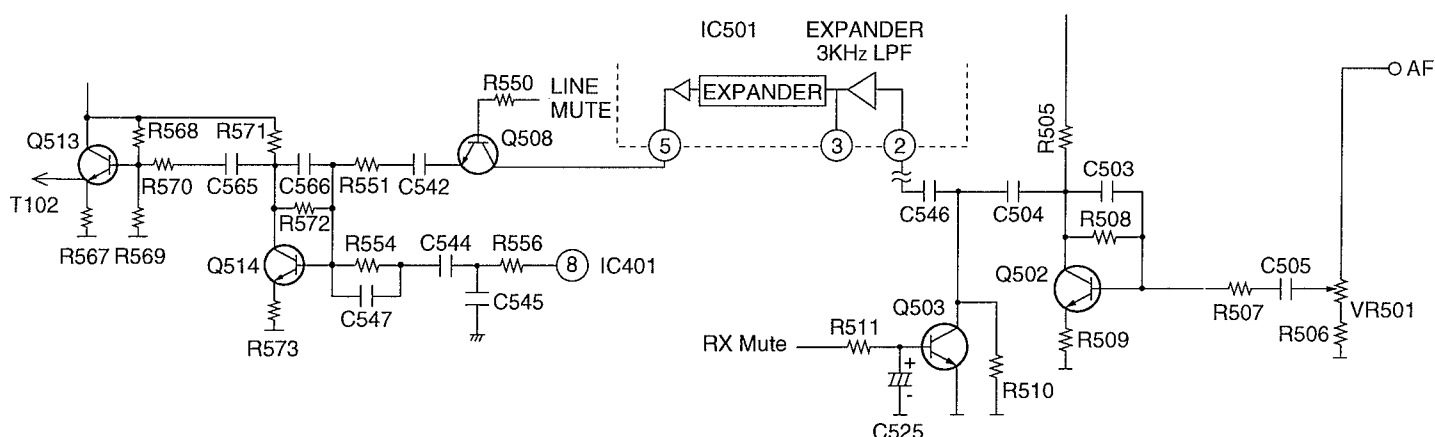
■ INTERCOM MODE

- 1) When the base unit LOCATOR/INTERCOM button is pressed, a call monitor signal (intercom sound) is output from pin ②⑦ of IC201 becomes "LOW". Thus a monitor tone is heard from the speaker.
- 2) At the same time, pin ①⑨ of IC201 goes "Low", and the transmission state is reached. Then the modulated data signal is output from pin ①⑦ of IC201. Flashing of the IN USE/CHARGE (LED702) is obtained from pin ①③ of IC702. This status is called "Intercom stand-by".
- 3) The receiving signal flows:
 RF → pin ①① of CN501 → VR501 → Q502 → C504 → R513 → pin ② of IC501 → pin ⑤ of IC501 → collector of Q511 → emitter of Q511 → R557 → C558 → base of Q401 → emitter of Q401 → pin ②⑥ of IC401 → pin ②⑨ and ③① of IC401 → Speaker.
- 4) The transmission signal flows:
 MIC → pin ①⑤ of IC401 → pin ②② of IC401 → C535 → C521 → R523 → pin ②① of IC501 → pin ②① of IC501 → C520 → R521 → R520 → C519 → pin ①⑥ of IC501 → pin ①③ of IC501 → R519 → pin ①① of IC501 → pin ①① of IC501 → R516 → VR502 → pin ① of CN501 → RF.

■ LINE SENDING SIGNAL

The AF signal output from the AF terminal of the RF unit is adjusted to the appropriate level by VR501, amplified by Q502, and input to IC501. The RX DATA signal from the portable handset is muted at this point by Q502 to prevent the RX DATA from leaking onto the line. IC501 comprises a 3 kHz LPF and an expander IC. The signal compressed by the portable handset is expanded, recreating it as a normal signal. The output from the expander passes through amplifier Q514 and buffer amplifier Q513 before being input to line transformer T102. In the speakerphone mode, the signal is supplied from pin ④ of IC401 to Q514.

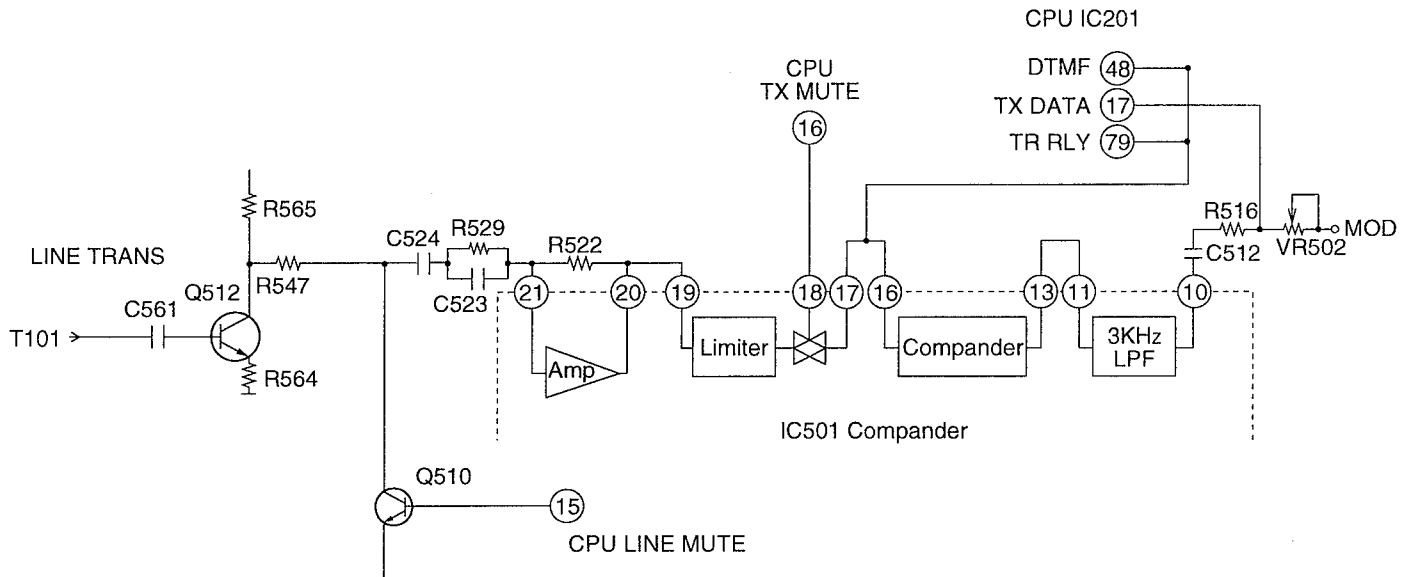
Circuit Diagram



LINE RECEIVING SIGNAL

The audio signal from line transformer T101 is amplified by Q512 and input to IC501. IC501 comprises an amplifier, limiter, mute circuit, compander, and 3 kHz LPF. It performs signal processing. The audio signal output from pin ⑩ of IC501 is mixed with the DTMF, TX DATA, and TR RLY signals. At this point (in the talk mode), the DTMF tones, pulse dial tones, and data transferred between the portable handset and base unit is input to the modulator circuit.

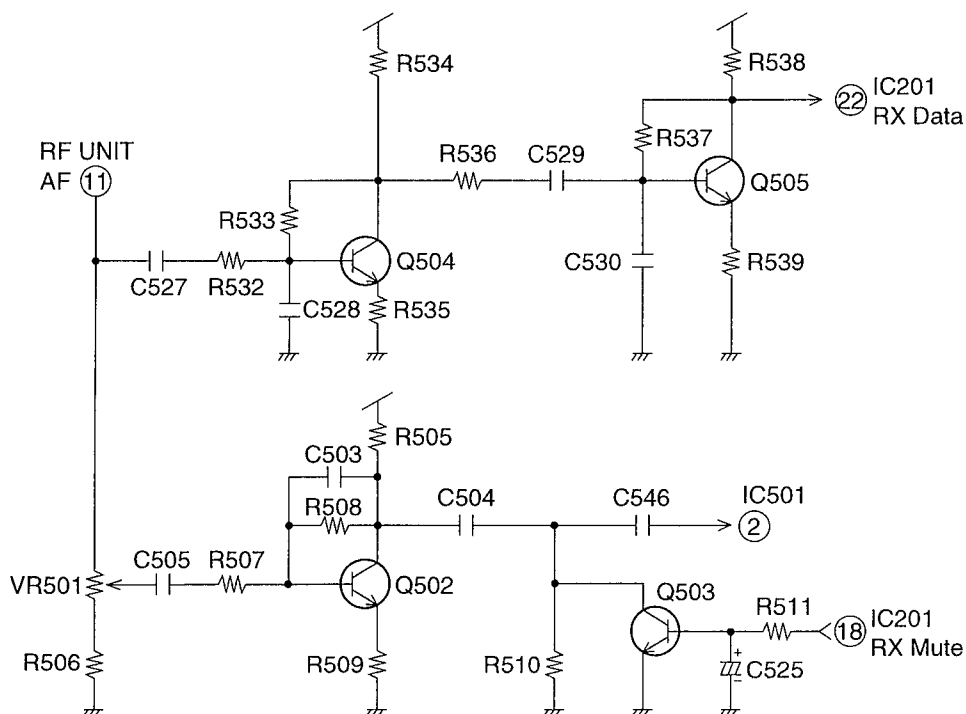
Circuit Diagram



RX DATA CIRCUIT

The resulting demodulated data waveform is then input to RX DATA pin ②② of IC201.

If there is data from the portable handset during talk operation, the portable handset data is as shown below to prevent the data from leaking onto the line.



■ INITIALIZING CIRCUIT

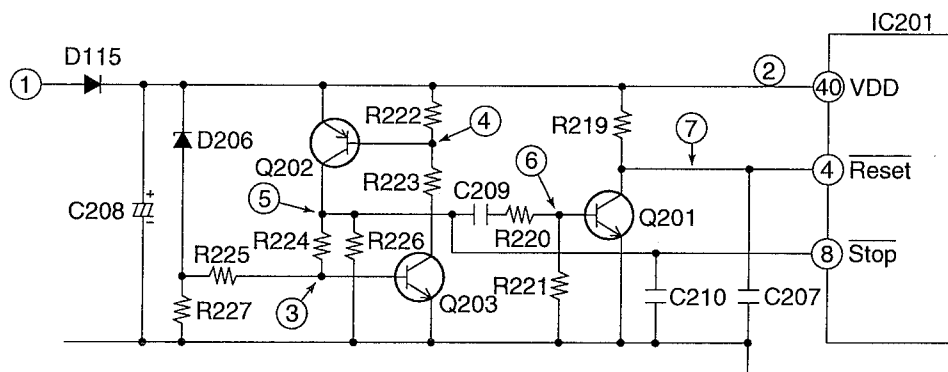
Function:

This circuit is used for to initialize the microcomputer when it incorporates an AC adaptor.

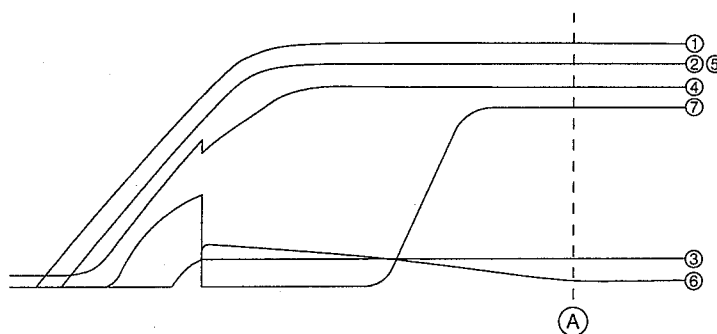
Circuit Operation:

When the AC Adaptor is inserted into the unit, then the voltage is shifted by D115 and power is supplied to the CPU. The set can operate beyond point (A) in the circuit voltage diagram.

Circuit Diagram



Circuit Voltage



■ CPC (CALLING PARTY CONTROL) DETECTOR CIRCUIT

Function:

The CPC DETECTOR complements the units shut off, in the ANSWER mode, after the caller hangs up. At this time, the CPC DETECTOR takes over.

The CPC DETECTOR senses the temporary disconnection of the telephone line which occurs after the caller hangs up.

Circuit Operation:

When off-hook, the DC current of telephone line flows as follows:

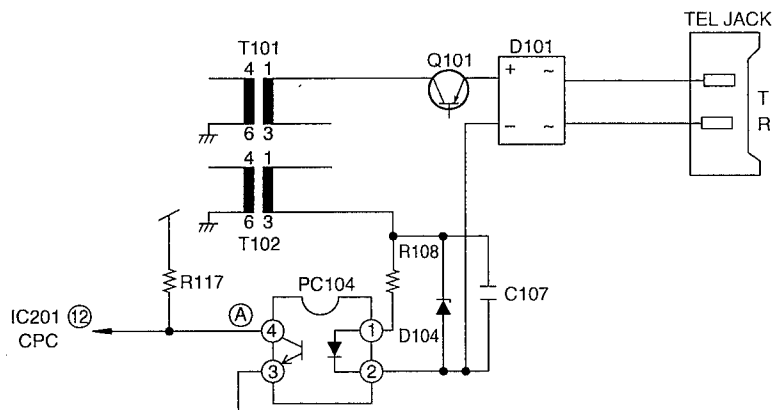
$T \rightarrow D101 \rightarrow T101 \rightarrow T102 \rightarrow R108 \rightarrow PC104 \rightarrow D101 \rightarrow R$

When in the off-hook mode, the collector of PC104 is at Low level.

If an instant break down of the telephone line occurs, the collector of phototransistor goes to a high level from a low level.

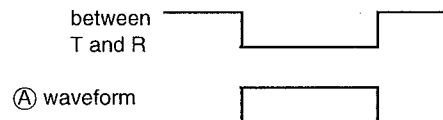
(The CPC detector is designed for the instant break down of more than 8 msec. or 600 msec.)

Circuit Diagram



CPC Function

	A	B
OK	more than 8 ms	more than 600 ms
NG	less than 5 ms	less than 350 ms



■ DTMF SIGNAL

When the DTMF data from the portable unit is received, the DTMF signal is output from pin ④⑧ of the CPU and sent to the line through Q514, Q513.

■ ID CODE SETTING

When the portable handset is placed on the base unit, the charge detector operates and ID data is output from pin ①⑦ of the CPU. After passing through data amplifier Q110 and the charge terminal, the data is sent to the portable handset.

AUTO DISCONNECT CIRCUIT

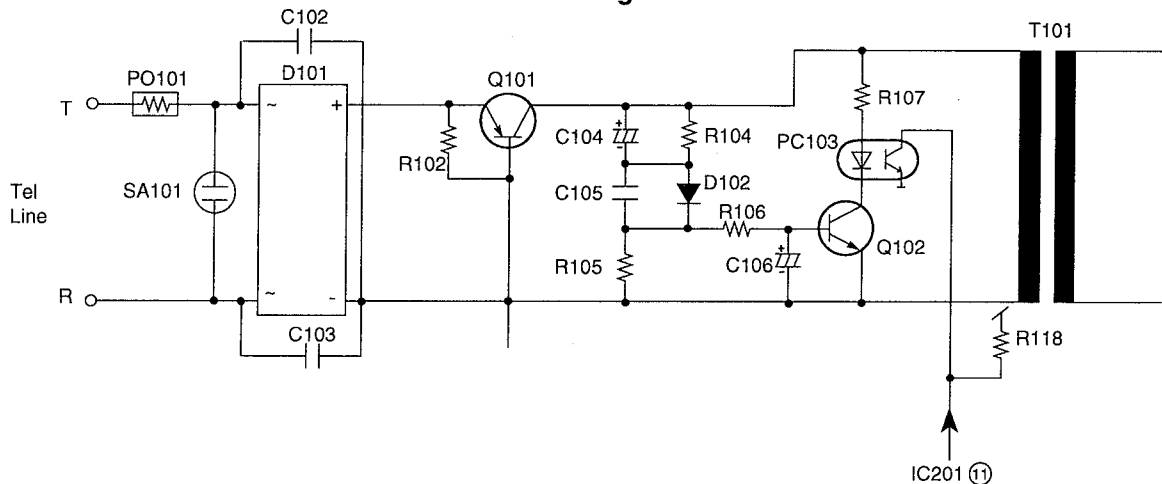
Function:

This circuit is used to detect the fact that another telephone connected to the same line is OFF-HOOK while the unit is in a receiving status or OGM transmitting status.

Circuit Operation:

T → PO101 → D101 → Q101 → C104 → D102 → R106 → Q102. During this interval C106 charges and the base of Q102 becomes High, causing Q102 to go ON. If a parallel-connected telephone is put into an OFF HOOK status, charge ceases to flow to C104, and the base of Q102 becomes Low, causing Q102 to go OFF. However, the system is designed so that if the voltage fluctuation is small, the charging and discharging of C106 has no effect on the system. When a line is connected, Q101 goes ON, causing pin ⑪ of IC201 to go low. When the line is disconnected, Q101 goes off, causing pin ⑪ of IC201 to go high.

Circuit Diagram



POWER SUPPLY CIRCUIT

Function:

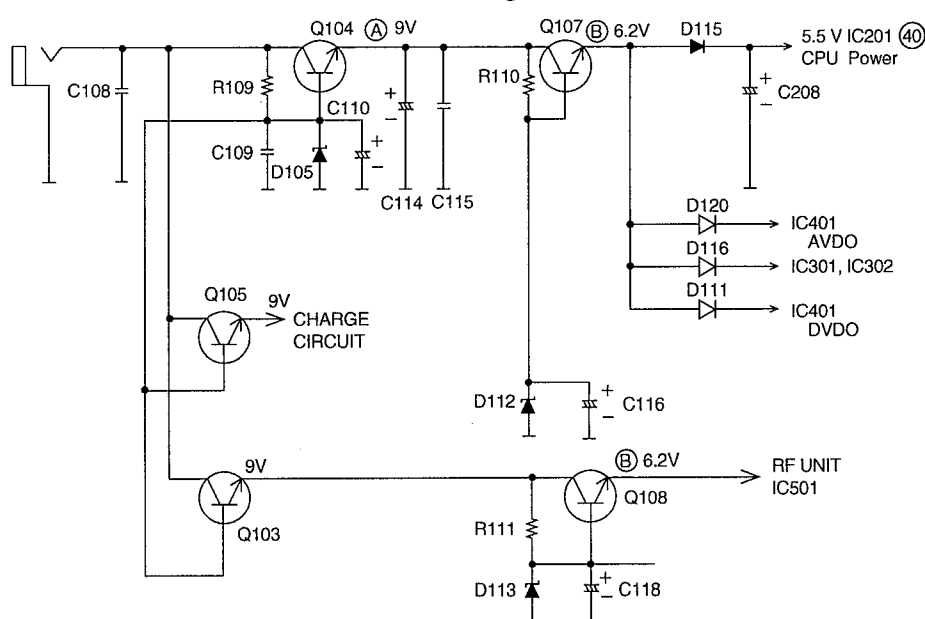
Power from the AC adaptor passes through a 5-stage regulating block consisting of Q103 ~ Q105, Q107 and Q108 and provides system voltages of 9 V and 6.2 V.

Circuit Operation:

Q103 ~ Q105 is a regulated power supply. The voltage at point (A) is regulated to 9 V by the zener voltage of D105. Q107, Q108 is a regulated power supply.

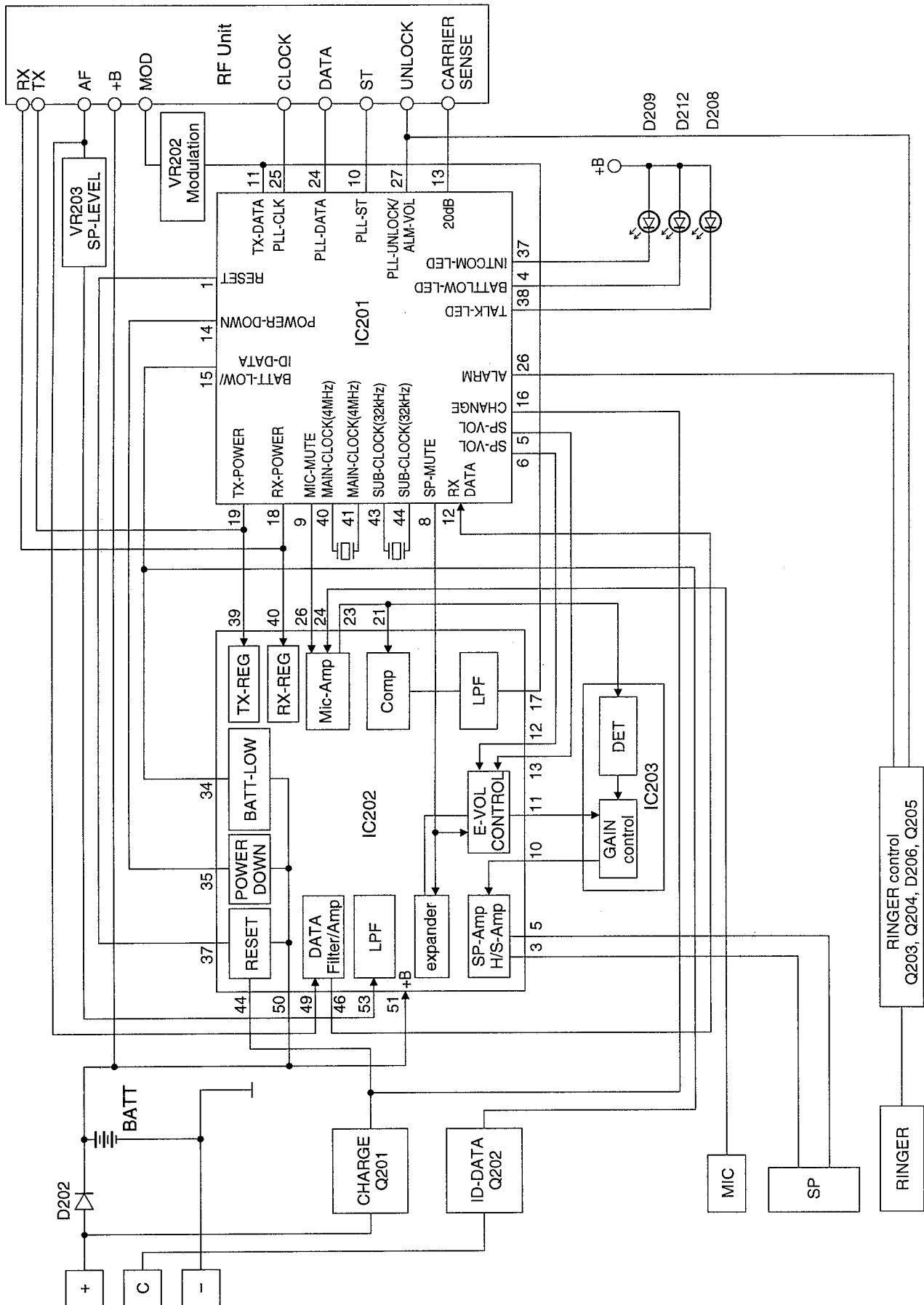
The voltage at point (B) is regulated to 6.2 V by the zener voltage of D112 and D113. The 6.2 V voltage is dropped by D111, D115, D116 and D120 to 5.5 V.

Circuit Diagram



BLOCK DIAGRAM (Portable Handset)

(Control Block)

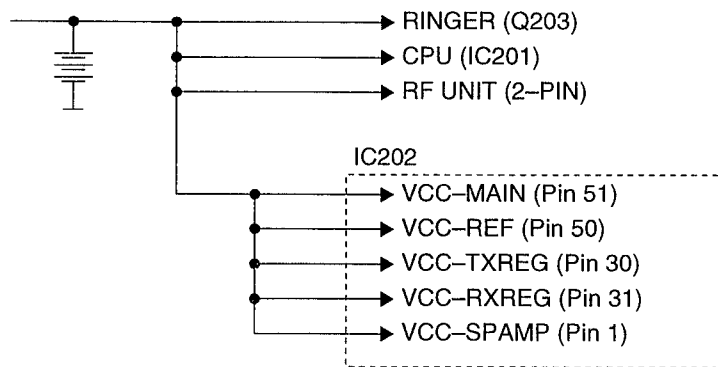


NEW CIRCUIT OPERATION (Portable Handset)

1. Power Supply Ciurcuit

As indicated as below, voltage is supplied separately to each block.

Circuit Diagram

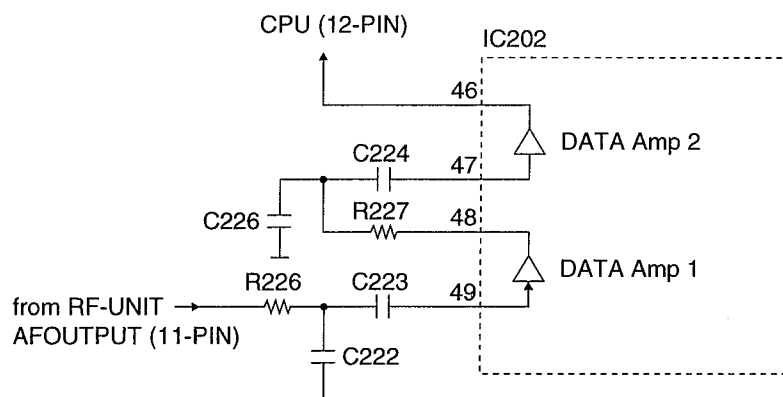


2. Data Reception Circuit

The wave detection signal from the RF UNIT has high frequency elements eliminated by a CR filter consisting of R226 and C222. Then it is amplified by DATA Amp1 and, once again, high frequency elements are eliminated by R227 and C226. After this, the signal is amplified by DATA Amp2 and input to pin ⑫ of the CPU.

The data output waveform is a block pulse.

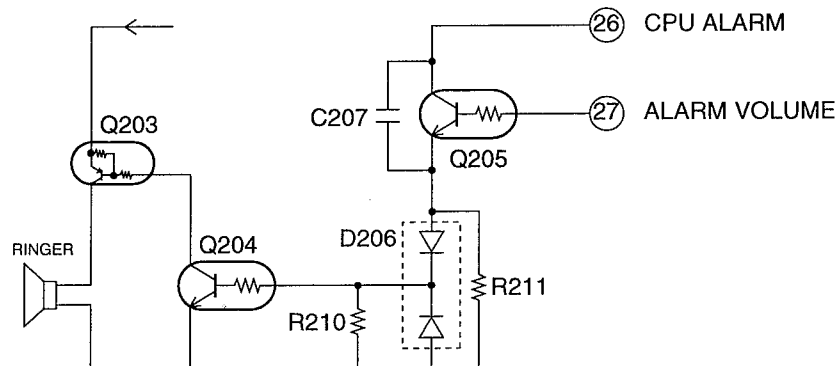
Circuit Diagram



3. Ringer Circuit

If the ringer volume is set to low and the key is entered occurs, an alarm tone is output from pin ②6 of the CPU and input to Q205 and C207. Then Q205 is turned off. The ringer sound is decreased depending on the time constant of C207 and R211. If the ringer volume is set to high, Q205 turns on and results in a louder beep tone.

Circuit Diagram



4. Reception Signal Circuit

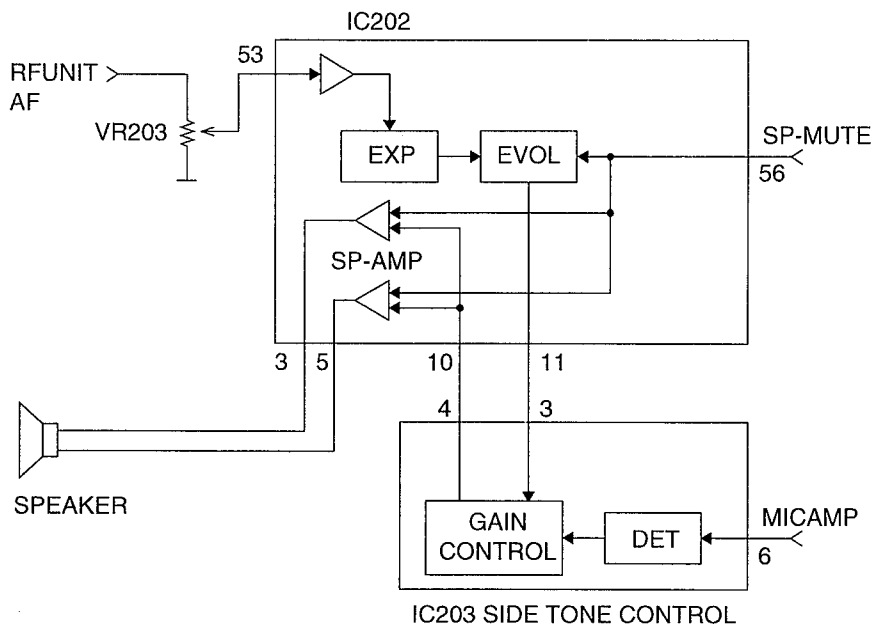
The receiver circuit comprises expander IC202, side tone control IC IC203.

After being adjusted to the appropriate level by VR203, the signal passes through a 3 kHz LPF and an expander built into IC202. It is then input to side tone IC IC208. The side tone IC is connected to the microphone amplifier. If a large input is input to the microphone, the gain control built into IC203 lowers the gain to reduce the output of the speaker amplifier. If there is no large input being input to the microphone, the amplifier in IC203 is set to standard gain. Consequently, the sound of the received audio signal becomes fainter when the user is talking in a loud voice and the side tone level is lowered. When the user talks more softly, the received audio signal is audible at the standard level.

RX VOL	EV1 ⑫ pin	EV2 ⑬ pin
+7dB	H	L
0dB	L	H
-7dB	L	L

SP MUTE H: SPEAKER OFF
L: SPEAKER ON

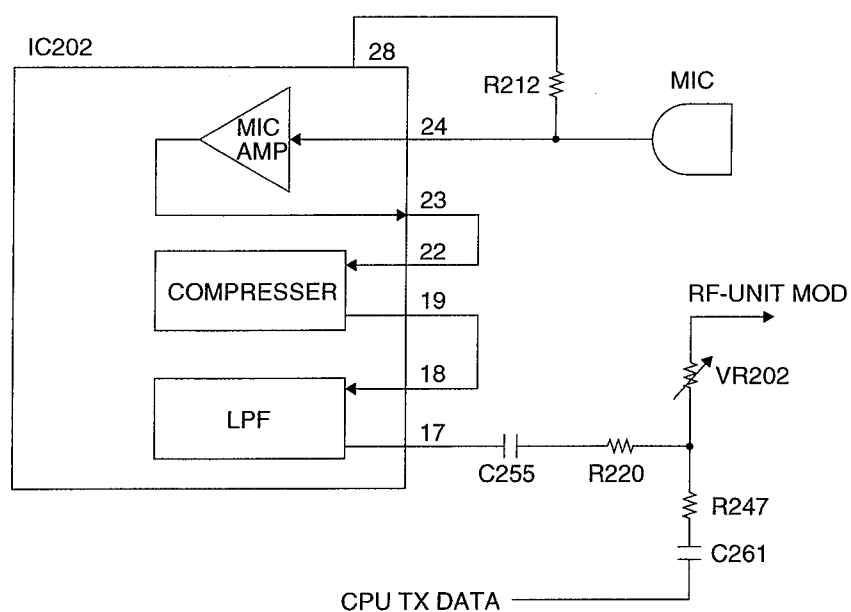
Circuit Diagram



5. Sending Signal

The audio signal from the microphone is amplified by Mic Amp, compander, and 3 kHz LPF built into IC202. It is then mixed with the TX DATA signal from the CPU, the modulation is adjusted by VR202, and input to the modulator in the RF UNIT.

Circuit Diagram

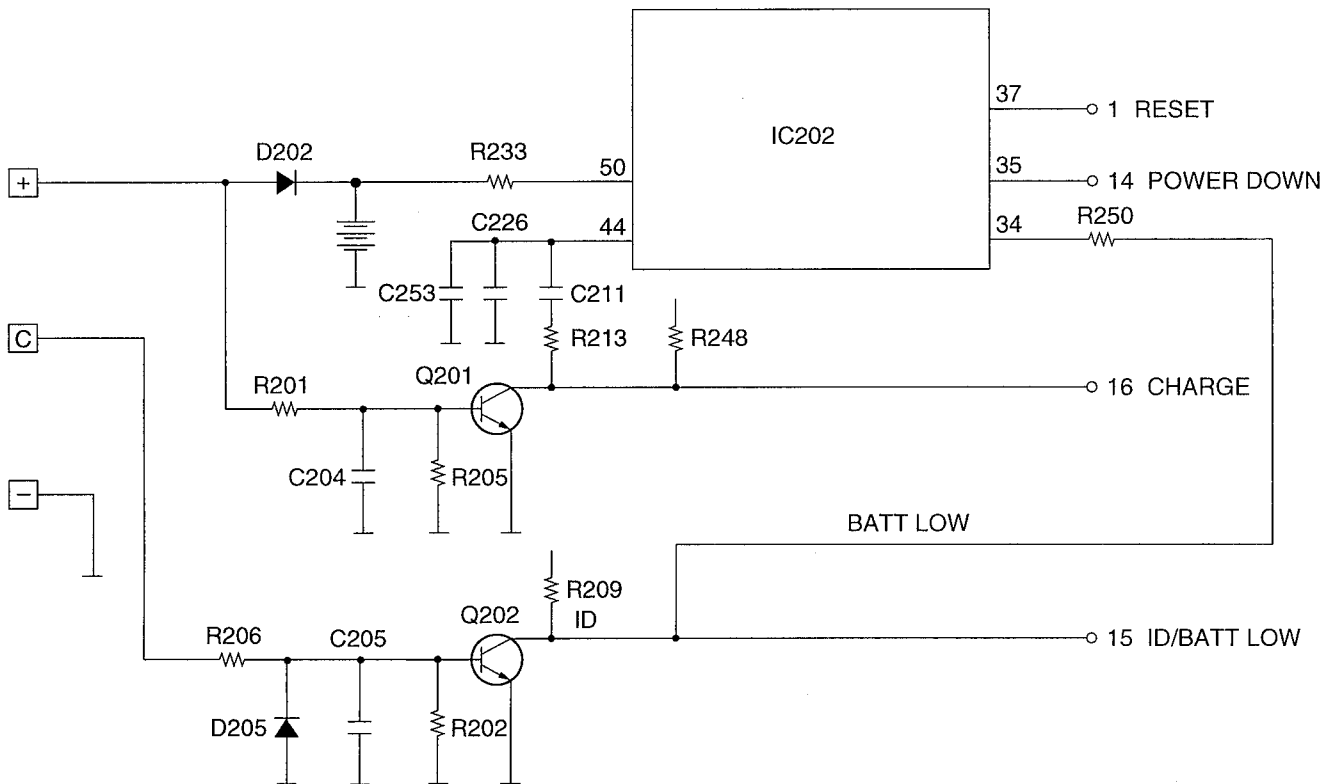


MC-Service

6. Reset/Power Down/Battery Low/ID

When the battery is installed in the portable handset, the reset circuit consisting of R213, C211, and inside IC202 functions, inputting a reset signal to the CPU. This ensures that the unit will operate normally without the user's needing to switch the power off and on. When the voltage from the batteries drops to 3.5 V, 3.5 V voltage detector inside IC202 operates and inputs a battery low signal to the CPU. This causes the battery low LED to turn on. If voltage continues to drop and reaches 3.2 V, 3.2 V voltage detector inside IC202 operates and outputs a power down signal to the CPU. This causes power to be cut off automatically and prevents the battery from over discharging. Q201 is a charge detector that informs the CPU whether or not the portable handset is currently being charged. During charging, ID data is sent from the base unit. Q202 receives this ID data and sends it to the CPU.

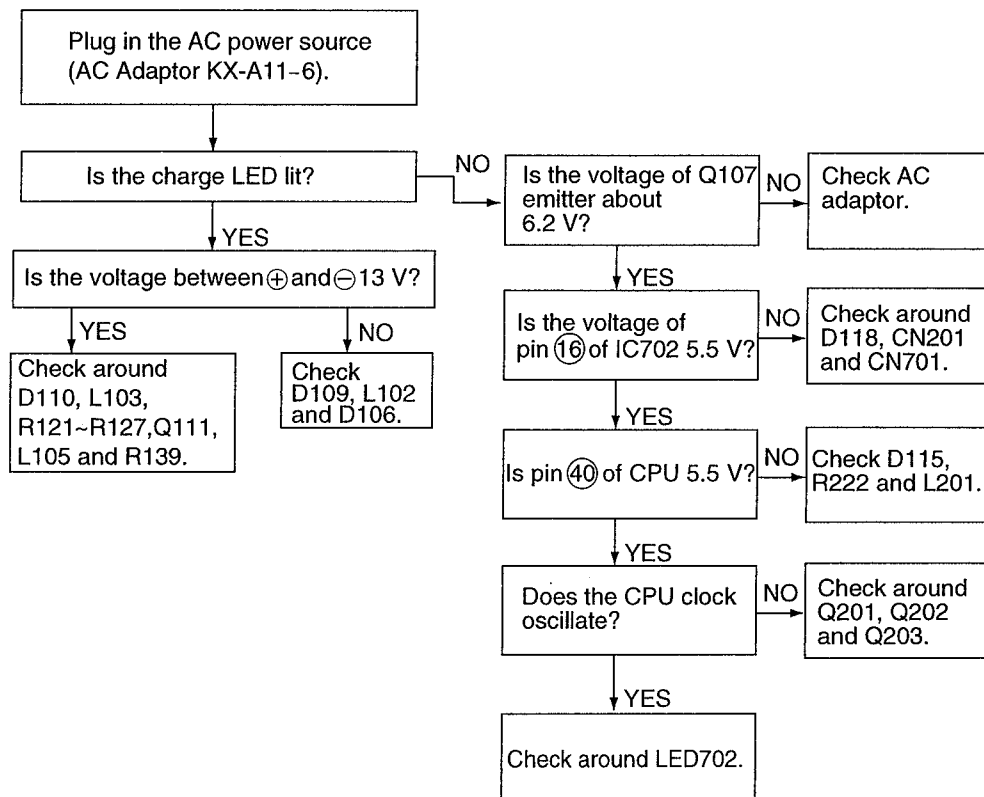
Circuit Diagram



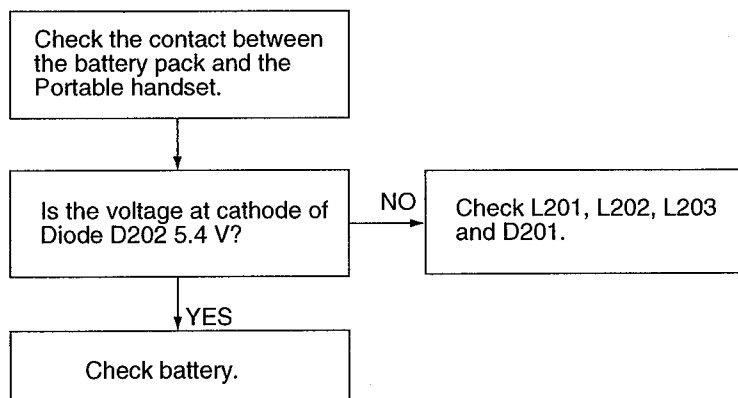
TROUBLESHOOTING GUIDE

(CORDLESS SECTION)

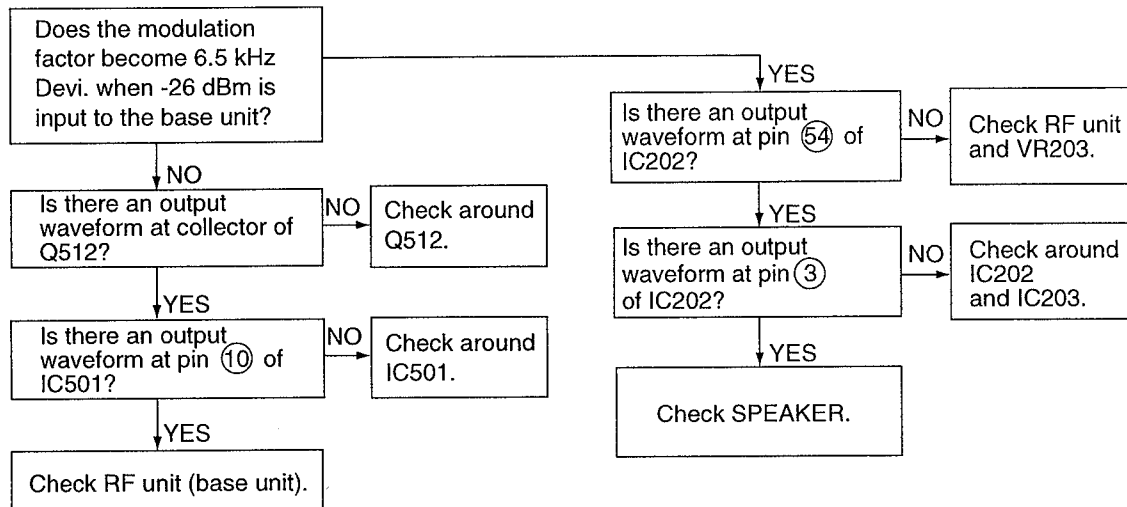
1. Battery won't charge (Base unit)



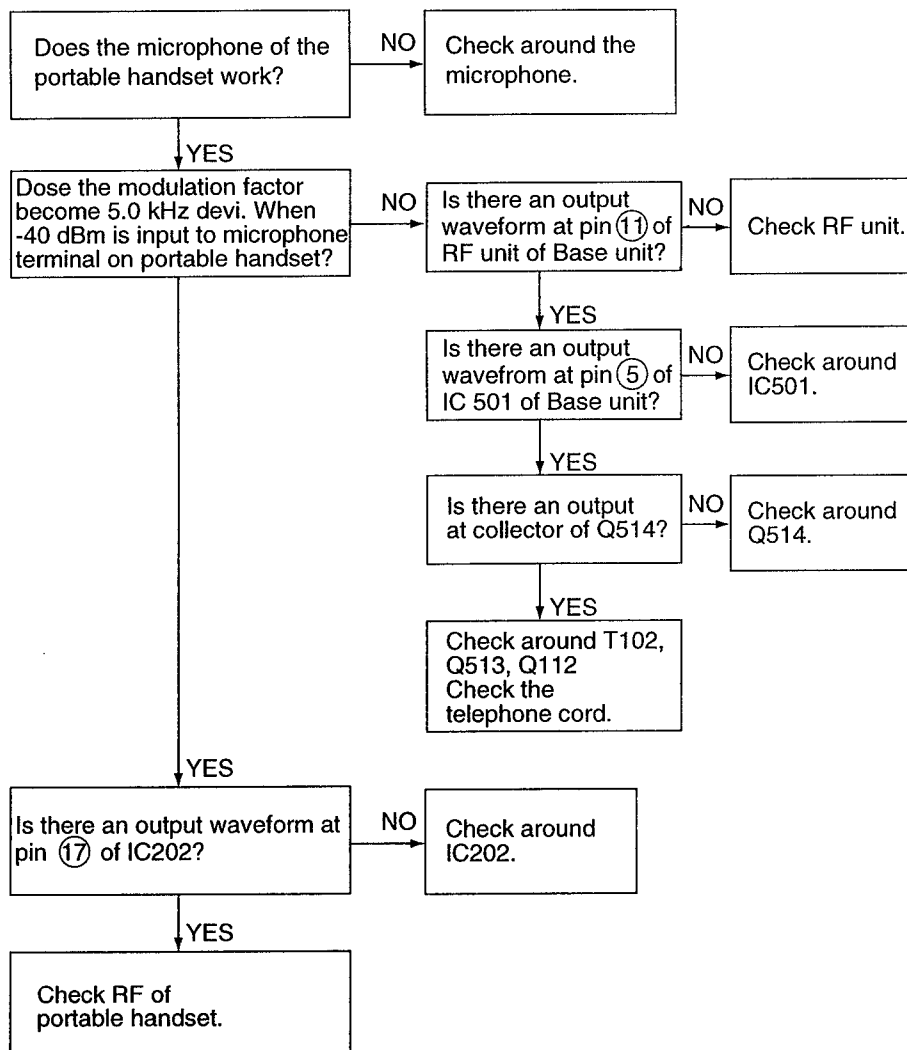
2. Battery won't charge (Portable handset)



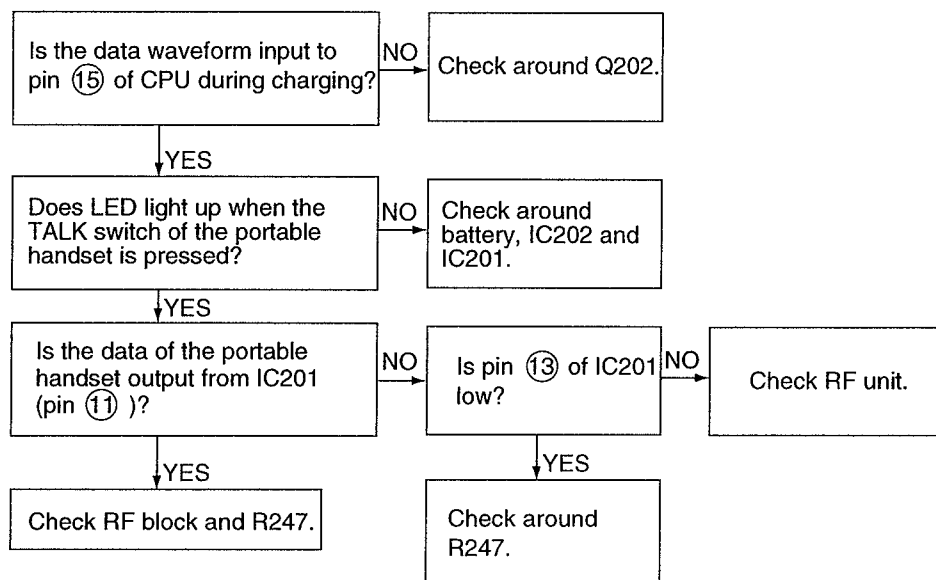
3. No voice reception



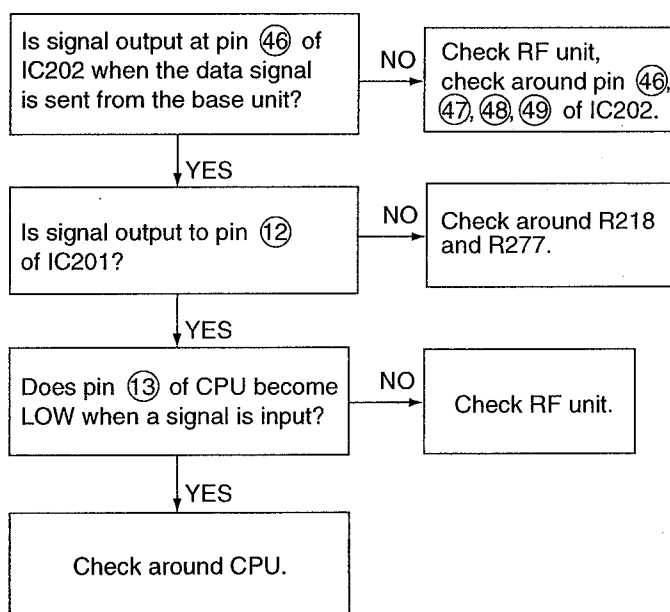
4. No voice transmission

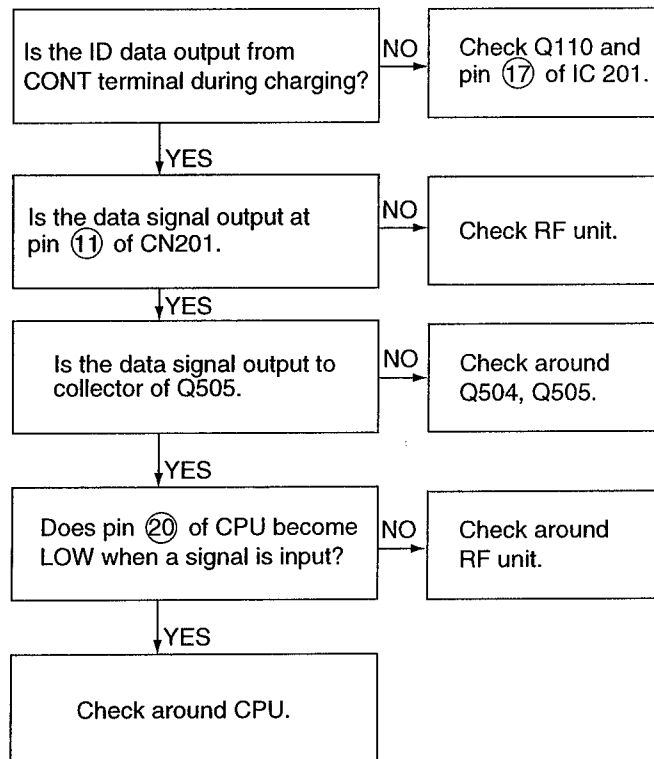
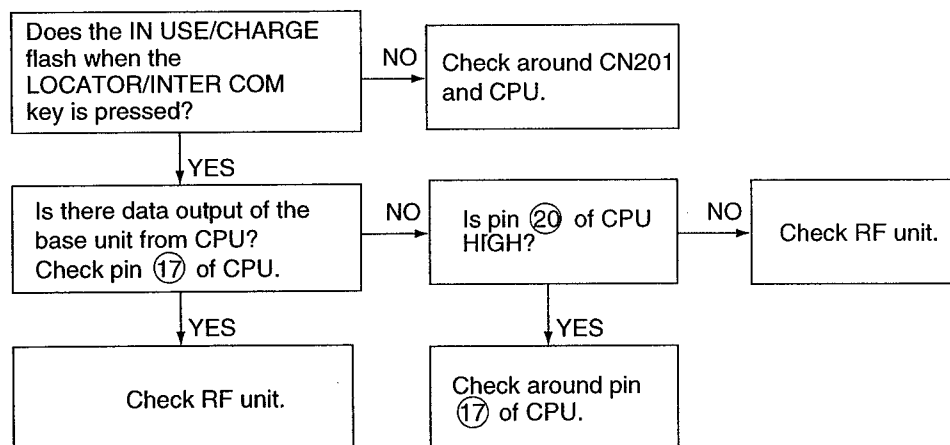


5. No link (Portable handset TX)



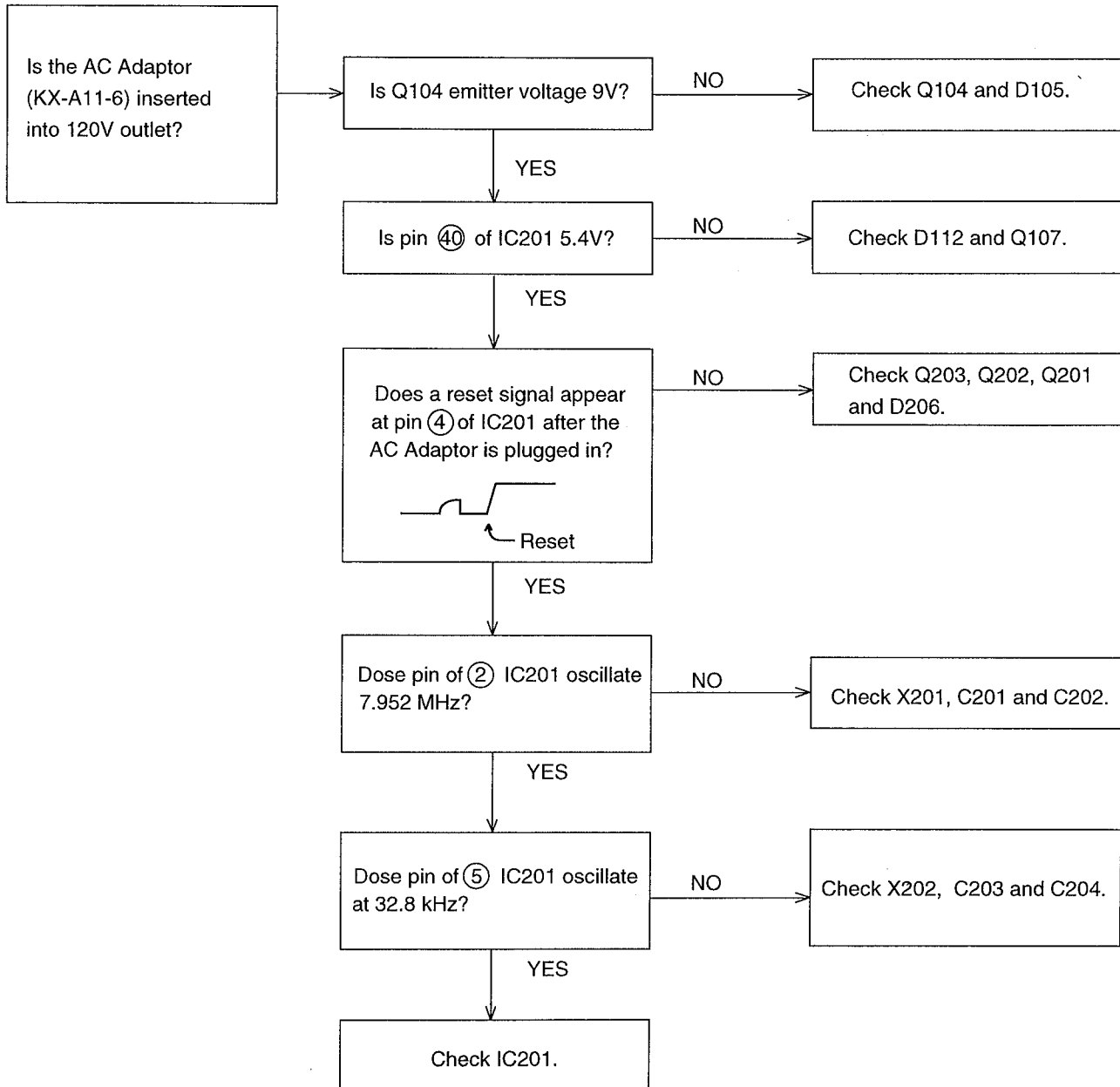
6. No link (Portable handset RX)

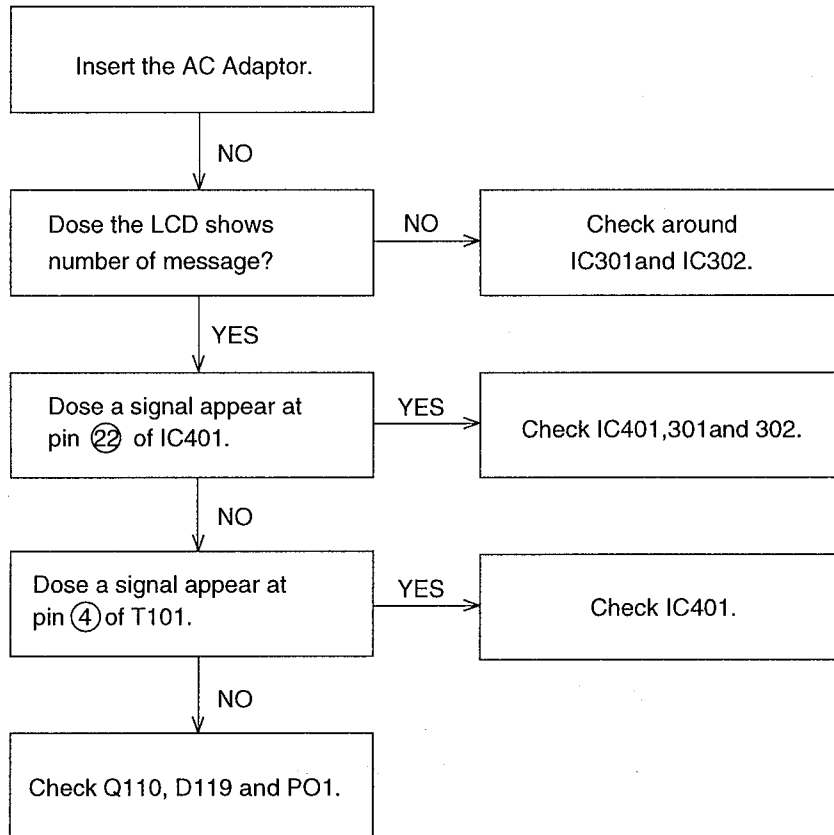
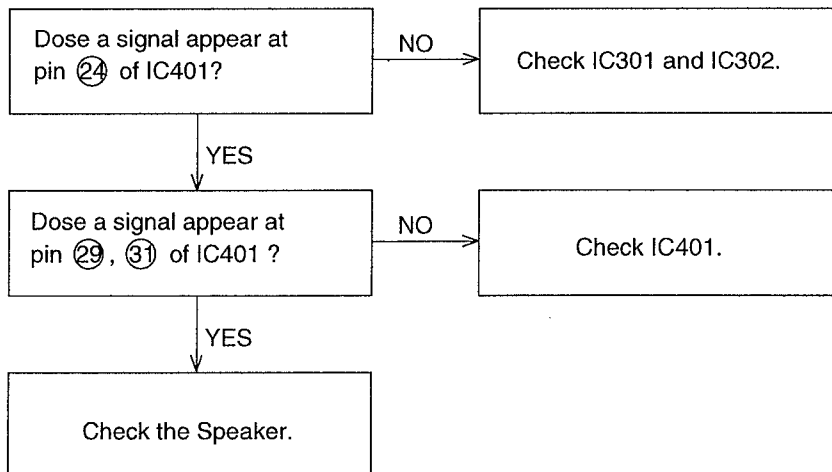


7. No link (Base unit RX)**8. No link (Base unit TX)**

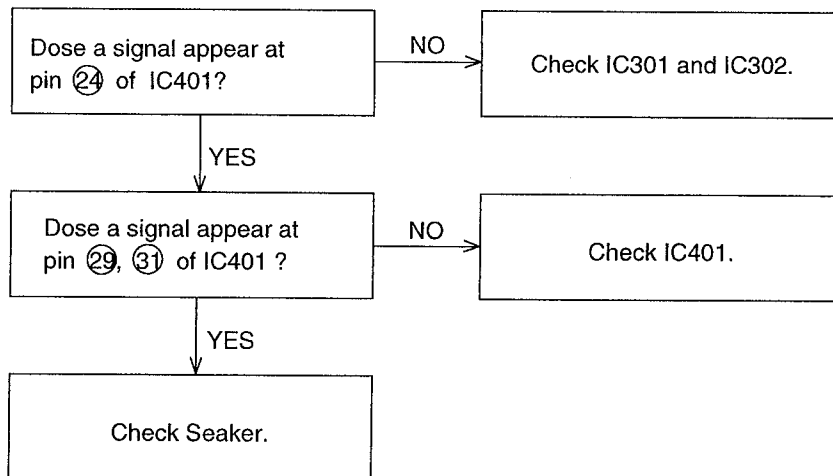
(TAM SECTION)

1. FUNCTIONS DO NOT OPERATE



2. DOES NOT RECORD**3. DOES NOT PLAYBACK**

4. CANNOT FIND THE SYNTHESIZED VOICE



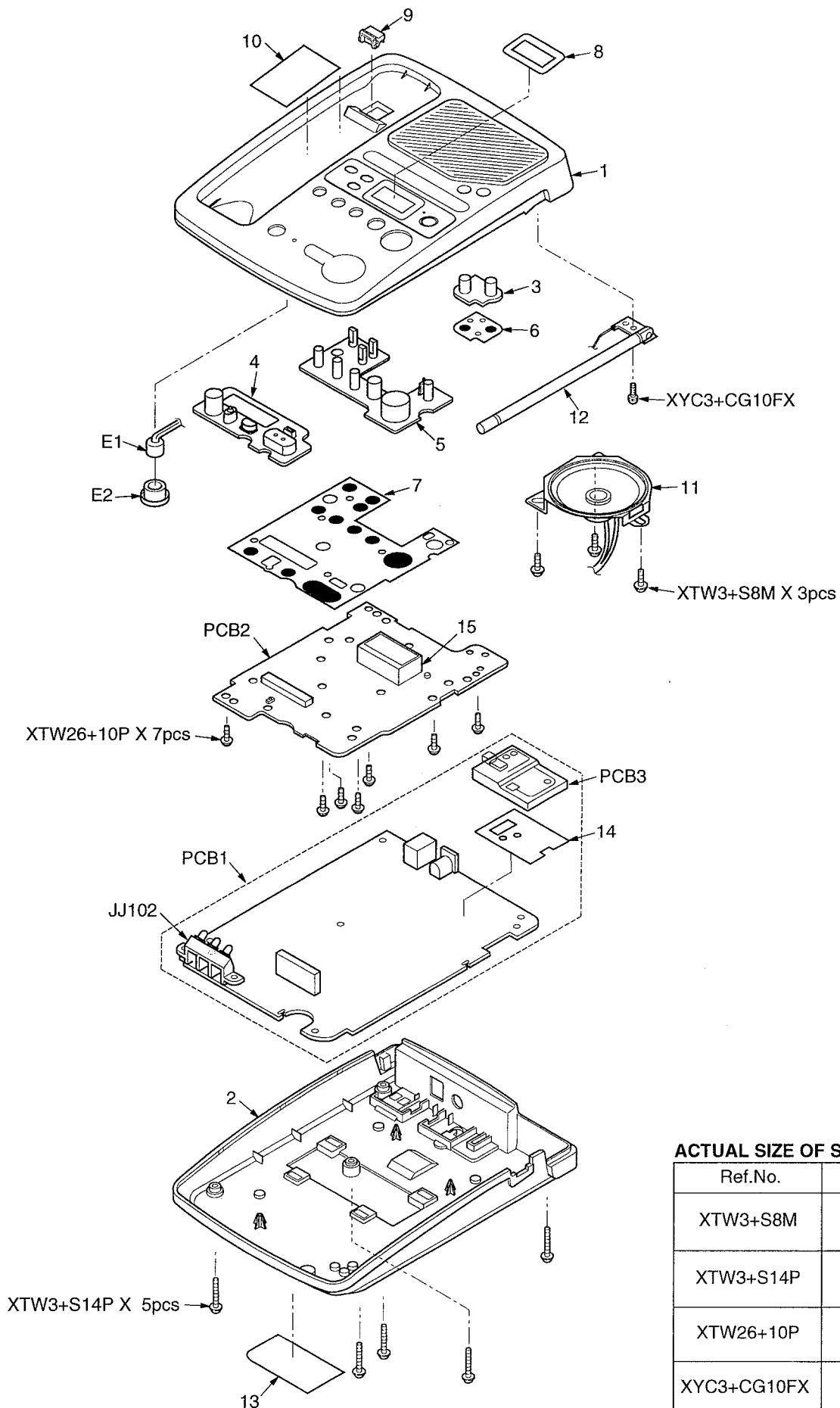
5. END OF MESSAGE IS CLIPPED WHEN CALLER HANGS UP

When caller hangs up, the KX-TCM939-B/KX-TCM941-B can detect the following 4 signal type.

- A. CPC pulse.
- B. Dial tone or other continuous tones.
- C. Silence.
- D. Cycle signals.

A. Check CPC DETECTOR CIRCUIT (D104, R108, R117, PC104)
B.,C.,D
Check IC401 and IC301

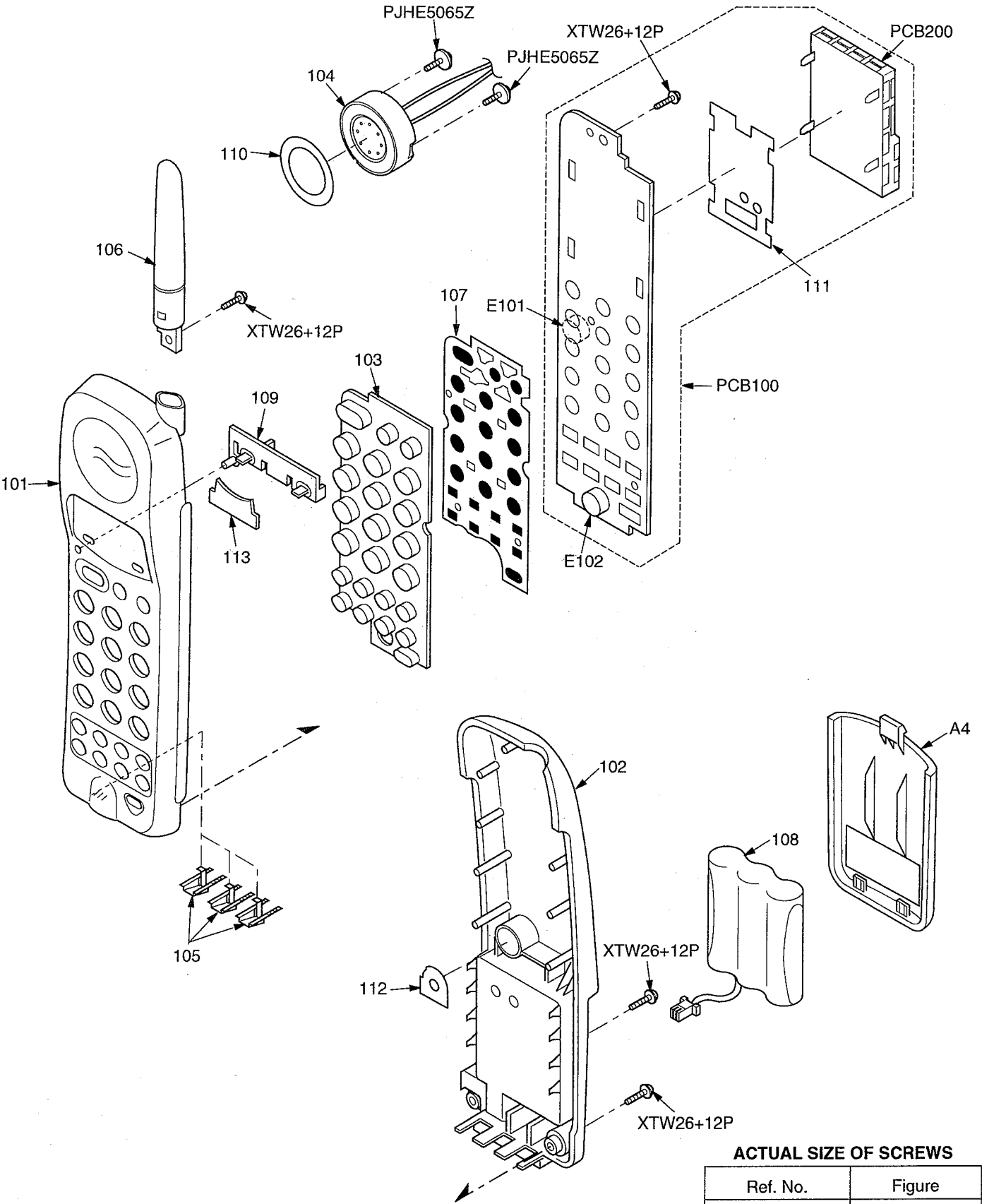
CABINET AND ELECTRICAL PARTS (Base Unit)



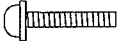

ACTUAL SIZE OF SCREWS

Ref.No.	Figure
XTW3+S8M	
XTW3+S14P	
XTW26+10P	
XYC3+CG10FX	

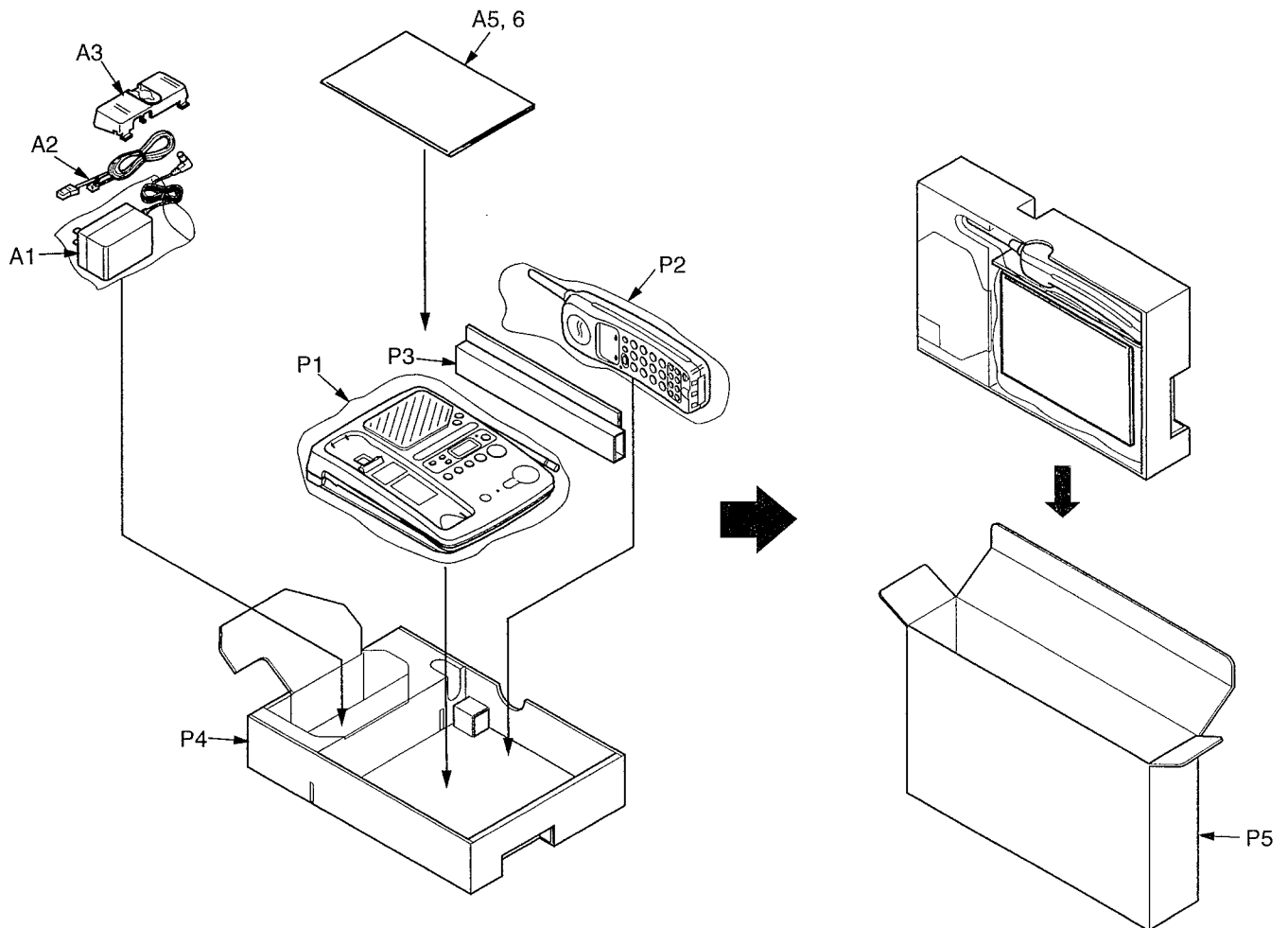
CABINET AND ELECTRICAL PARTS (Portable Handset)



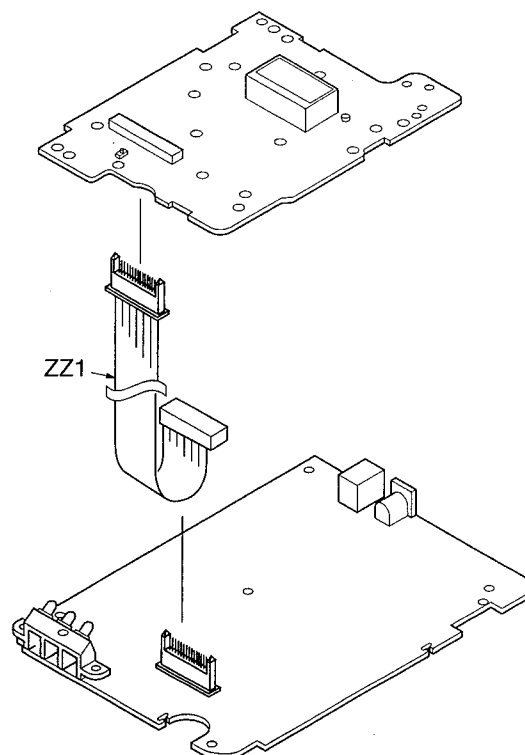
ACTUAL SIZE OF SCREWS

Ref. No.	Figure
XTW26+12P	
PJHE5065Z	

ACCESSORIES AND PACKING MATERIALS



TOOL



KX-TCM939-B/KX-TCM941-B

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

REPLACEMENT PARTS LIST**Base Unit**

Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention.

After the end of this period, the assembly will no longer be available.

2. Important safety notice.

Components identified by a Δ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms (Ω) K=1000 Ω , M=1000K Ω

All capacitors are in MICRO FARADS (μ F) P= μ F

*Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
------------	------------	---------	------	------	------

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECED,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others		
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V	
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V	
2E:250V	2:200V	1V:35V	1C :16V	1J :63V	
2H:500V		0J:6.3V	1E,25:25V	2A :100V	

Ref. No.	Part No.	Part Name & Description	Pcs/Set
MAIN P.C.BOARD PARTS			
PCB1	PQWP941BHWRF	P.C.BOARD ASS'Y (RTL)	1
		(ICS)	
IC201	PQV153MF5015	IC	1
IC301	PQVID6471A2	IC	1
IC302	PQWITCM422HM	IC	1
IC401	PQVIMX93002F	IC	1
IC402	AN6123MS	IC	1
IC501	AN6165SB	IC	1
		(TRANSISTORS)	
Q101	2SA1627	TRANSISTOR(SI)	1
Q102	2SD601R	TRANSISTOR(SI)	1
Q103	2SD1994A	TRANSISTOR(SI)	1
Q104	2SD2137	TRANSISTOR(SI)	1
Q105	2SD2136	TRANSISTOR(SI)	1
Q107	2SD2136	TRANSISTOR(SI)	1
Q108	2SD1994A	TRANSISTOR(SI)	1
Q109	2SD601R	TRANSISTOR(SI)	1
Q110	2SD1991A	TRANSISTOR(SI)	1
Q111	2SD1994A	TRANSISTOR(SI)	1
Q112	2SC2120	TRANSISTOR(SI)	1
Q113	2SD601R	TRANSISTOR(SI)	1
Q201	2SD601R	TRANSISTOR(SI)	1
Q202	2SB709A	TRANSISTOR(SI)	1
Q203	2SD601R	TRANSISTOR(SI)	1
Q401	2SD601R	TRANSISTOR(SI)	1
Q502	2SD601R	TRANSISTOR(SI)	1
Q503	2SD601R	TRANSISTOR(SI)	1
Q504	2SD1819A	TRANSISTOR(SI)	1
Q505	2SD1819A	TRANSISTOR(SI)	1
Q506	2SD601R	TRANSISTOR(SI)	1
Q507	PQVTDTC143TK	TRANSISTOR(SI)	1
Q508	2SD601R	TRANSISTOR(SI)	1
Q510	2SD601R	TRANSISTOR(SI)	1
Q511	2SD601R	TRANSISTOR(SI)	1
Q512	2SD1819A	TRANSISTOR(SI)	1
Q513	2SD601R	TRANSISTOR(SI)	1
Q514	2SD1819A	TRANSISTOR(SI)	1
		(DIODES)	
D101	PQVDS1ZB40F1	DIODE(SI)	1
D102	1SS119	DIODE(SI)	1
D103	MA4180	DIODE(SI)	1
D104	MA4036	DIODE(SI)	1
D105	MA4100	DIODE(SI)	1
D106	PQVDS5688G	DIODE(SI)	1
D107	MA4068	DIODE(SI)	1
D108	MA4150	DIODE(SI)	1
D109	MA4150	DIODE(SI)	1
D110	MA4150	DIODE(SI)	1
D111	1SS119	DIODE(SI)	1
D112	MA4068	DIODE(SI)	1
D113	MA4068	DIODE(SI)	1
D114	PQVDS5688G	DIODE(SI)	1
D115	PQVDS5688G	DIODE(SI)	1
D116	PQVDS5688G	DIODE(SI)	1
D117	1SS119	DIODE(SI)	1
D118	1SS119	DIODE(SI)	1
D119	MA4056	DIODE(SI)	1
D120	PQVDS5688G	DIODE(SI)	1
D121	PQVDS5688G	DIODE(SI)	1
D202	1SS119	DIODE(SI)	1
D203	1SS119	DIODE(SI)	1
D204	1SS119	DIODE(SI)	1
D205	1SS119	DIODE(SI)	1
D206	MA4047	DIODE(SI)	1

CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Pcs/Set
1	PQKM10334Y1	UPPER CABINET	1
2	PQYF10126Q1	LOWER CABINET	1
3	PQBX10303Z	BUTTON	1
4	PQBX10304Y	BUTTON	1
5	PQBX10305Z	BUTTON	1
6	PQSX10077Z	KEYBOARD SWITCH	1
7	PQSX10078Z	KEYBOARD SWITCH	1
8	PQGP10140Z1	PANEL	1
9	PQKE10072Z1	HANGER	1
10	PQQT11232Z	INDICATION LABEL	1
11	PQAS65P36Y	SPEAKER	1
12	PQSA10047Z	ANTENNA	1
13	PQGT13244Z	NAME PLATE (for KX-TCM939-B)	1
13	PQGT13243Z	NAME PLATE (for KX-TCM941-B)	1
14	PQHX10816Z	INSULATOR	1
15	PQHR10552Z	LCD HOLDER	1

MC-Service

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Ref. No.	Part No.	Part Name & Description	Pcs/Set
D401	MA4068	DIODE(SI)	1	R110	PQ4R10XJ391	390	1
D402	MA4068	DIODE(SI)	1	R111	PQ4R10XJ561	560	1
D502	1SS119	DIODE(SI)	1	R112	ERJ3GEYJ104	100K	1
D503	MA153	DIODE(SI)	1	R113	ERJ3GEYJ103	10K	1
D801	1SS119	DIODE(SI)	1	R114	ERJ3GEYJ104	100K	1
D802	1SS119	DIODE(SI)	1	R115	ERDS2TJ153	15K	1
				R116	ERDS2TJ222	2.2K	1
		(COILS AND TRANSFORMERS)		R117	ERDS2TJ221	220	1
L101	PQLQZM2R2K	COIL	1	R118	ERDS2TJ333	33K	1
L102	PQLQZM2R2K	COIL	1	R119	ERDS2TJ332	3.3K	1
L103	PQLQZM2R2K	COIL	1	R120	ERDS1TJ473	47K	1
L104	PQLQR2N100K	COIL	1	R121	ERDS1TJ221	220	1
L105	PQLQZM2R2K	COIL	1	R122	ERDS2TJ390	39	1
L201	PQLE125	COIL	1	R123	ERDS2TJ330	33	1
L301	PQLQR1ET	COIL	1	R124	ERDS2TJ390	39	1
L402	PQLQZM2R2K	COIL	1	R125	ERDS2TJ330	33	1
L403	PQLQZM2R2K	COIL	1	R126	ERDS2TJ390	39	1
L801	PQLQR2M3N3K	COIL	1	R127	ERDS2TJ330	33	1
T101	PQLT3E3A	I.F. TRANSFORMER	△ 1	R128	ERJ3GEYJ104	100K	1
T102	PQLT3E3A	I.F. TRANSFORMER	△ 1	R130	PQ4R10XJ821	820	1
				R131	PQ4R10XJ680	68	1
				R132	ERDS1TJ330	33	1
		(VARIABLE RESISTORS)		R133	PQ4R10XJ223	22K	1
VR501	EVNDXAA03B24	VARIABLE RESISTOR	1	R134	PQ4R10XJ333	33K	1
VR502	EVNDXAA03B15	VARIABLE RESISTOR	1	R135	PQ4R10XJ102	1K	1
				R136	PQ4R10XJ101	100	1
				R137	ERJ3GEYJ104	100K	1
		(VARISTORS)		R138	ERJ3GEYJ102	1K	1
SA101	PQVDDSS301L	VARISTOR	1	R139	ERD25TJ122	1.2K	1
SA102	PQVDDSP272MR	VARISTOR	△ 1	R140	ERJ3GEYJ103	10K	1
				R141	ERJ3GEYJ103	10K	1
		(CRYSTAL OSCILLATORS)		R202	ERJ3GEYJ106	10M	1
X201	PQVCK7952N4Z	CRYSTAL OSCILLATOR	1	R203	ERJ3GEYJ104	100K	1
X202	PQVCL3276N6Z	CRYSTAL OSCILLATOR	1	R205	ERJ3GEYJ123	12K	1
X301	PQVCK3686N4Z	CRYSTAL OSCILLATOR	1	R206	ERJ3GEYJ272	2.7K	1
				R207	ERJ3GEYJ222	2.2K	1
				R209	ERJ3GEYJ472	4.7K	1
		(PHOTO COUPLERS)		R210	ERJ3GEYJ472	4.7K	1
PC101	PQVIPS25051P	PHOTO ELECTRIC TRANSDUCER	△ 1	R211	ERJ3GEYJ472	4.7K	1
PC102	PQVITLP627	PHOTO ELECTRIC TRANSDUCER	△ 1	R212	ERJ3GEYJ472	4.7K	1
PC103	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	1	R219	ERJ3GEYJ684	680K	1
PC104	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	1	R220	ERJ3GEYJ105	1M	1
				R221	ERJ3GEYJ334	330K	1
		(POSISTOR)		R222	ERJ3GEYJ473	47K	1
PO101	PQRPAR390N	POSISTOR	1	R223	ERJ3GEYJ224	220K	1
				R224	ERJ3GEYJ105	1M	1
		(JACKS)		R225	ERJ3GEYJ563	56K	1
JJ101	PQJJ1T008Y	JACK, TEL	1	R226	ERJ3GEYJ474	470K	1
JJ103	PQJJ1T022Z	JACK, DC IN	1	R227	ERJ3GEYJ563	56K	1
				R301	ERJ3GEYJ222	2.2K	1
		(OTHERS)		R302	PQ4R10XJ222	2.2K	1
E1	PQJM122Z	MICROPHONE	1	R303	PQ4R10XJ222	2.2K	1
E2	PQMG10022Z	SPACER	1	R304	PQ4R10XJ222	2.2K	1
JJ102	PQJT10147Y	CHARGE TERMINAL TERMIN.	1	R305	ERJ3GEYJ222	2.2K	1
CN201	PQJP14B55Z	CONNECTOR	1	R306	ERJ3GEYJ222	2.2K	1
				R307	ERJ3GEYJ222	2.2K	1
		(RESISTORS)		R308	ERJ3GEYJ222	2.2K	1
R101	ERDS2TJ473	47K	1	R309	ERJ3GEYJ222	2.2K	1
R102	ERDS2TJ104	100K	1	R310	ERJ3GEYJ222	2.2K	1
R103	ERDS2TJ472	4.7K	1	R311	ERJ3GEYJ222	2.2K	1
R104	PQ4R10XJ563	56K	1	R312	ERJ3GEYJ222	2.2K	1
R105	PQ4R10XJ153	15K	1	R313	PQ4R18XJ102	1K	1
R106	ERDS2TJ682	6.8K	1	R314	PQ4R18XJ221	220	1
R107	PQ4R10XJ682	6.8K	1	R315	ERJ3GEYJ105	1M	1
R108	ERDS2TJ560	56	1	R316	ERJ3GEYJ181	180	1
R109	ERDS2TJ221	220	1	R317	ERJ3GEYJ472	4.7K	1
				R318	ERJ3GEYJ472	4.7K	1
				R319	ERDS2TJ393	39K	1
				R401	ERJ3GEYJ683	68K	1
				R402	ERJ3GEYJ202	2K	1
				R403	ERJ3GEYJ224	220K	1
				R405	ERJ3GEYJ154	150K	1

KX-TCM939-B/KX-TCM941-B

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Ref. No.	Part No.	Part Name & Description	Pcs/Set
R406	ERJ3GEYJ682	6.8K	1	R801	ERJ3GEYJ104	100K	1
R407	ERJ3GEYJ105	1M	1	R802	ERJ3GEYJ104	100K	1
R408	ERJ3GEYJ103	10K	1	J132	PQ4R18XJ000	0	1
R409	ERJ3GEYJ153	15K	1	J143	PQ4R18XJ000	0	1
R410	ERJ3GEYJ333	33K	1	J144	PQ4R18XJ000	0	1
R411	ERJ3GEYJ393	39K	1	J145	ERJ3GEY0R00	0	1
R501	ERJ3GEYJ102	1K	1	J146	ERJ3GEY0R00	0	1
R502	ERJ3GEY0R00	0	1	J147	PQ4R10XJ000	0	1
R505	PQ4R10XJ332	3.3K	1	J149	ERJ3GEY0R00	0	1
R506	ERJ3GEYJ103	10K	1	J151	PQ4R10XJ000	0	1
R507	ERJ3GEYJ103	10K	1	J153	ERJ3GEY0R00	0	1
R508	ERJ3GEYJ564	560K	1	J154	ERJ3GEY0R00	0	1
R509	ERJ3GEYJ102	1K	1	J156	PQ4R18XJ000	0	1
R510	ERJ3GEYJ104	100K	1	J157	PQ4R18XJ000	0	1
R511	PQ4R10XJ472	4.7K	1	J179	ERJ3GEY0R00	0	1
R512	ERJ3GEYJ563	56K	1	J180	ERJ3GEY0R00	0	1
R513	ERJ3GEYJ123	12K	1	J181	ERJ3GEY0R00	0	1
R514	ERJ3GEYJ153	15K	1	C802	ERJ3GEY0R00	0	1
R515	ERJ3GEYJ153	15K	1				
R516	ERJ3GEYJ104	100K	1				
R517	ERJ3GEYJ333	33K	1				
R518	ERJ3GEYJ333	33K	1				
R519	PQ4R10XJ223	22K	1			(CAPACITORS)	
R520	ERJ3GEYJ123	12K	1	C101	ECQE2E224JZ	0.22	S 1
R521	ERJ3GEYJ103	10K	1	C102	ECKD2H681KB	680P	S 1
R522	ERJ3GEYJ563	56K	1	C103	ECKD2H681KB	680P	S 1
R523	ERJ3GEYJ683	68K	1	C104	ECEA1CU221	220	1
R524	ERDS2TJ333	33K	1	C105	PQCUV1H103KB	0.01	1
R525	ERJ3GEYJ274	270K	1	C106	ECEA1HKS2R2	2.2	S 1
R526	ERJ3GEYJ684	680K	1	C107	PQCUV1H103KB	0.01	1
R527	ERJ3GEYJ274	270K	1	C108	PQCUV1H821JC	820P	S 1
R528	ERJ3GEY0R00	0	1	C109	PQCUV1E104MD	0.1	S 1
R529	ERJ3GEYJ473	47K	1	C110	ECEA1CU221	220	1
R530	PQ4R10XJ153	15K	1	C111	PQCUV1H102J	0.001	S 1
R531	ERD25TJ824	820K	1	C112	PQCUV1H103KB	0.01	1
R532	ERJ3GEYJ823	82K	1	C113	PQCUV1H103KB	0.01	1
R533	ERJ3GEYJ474	470K	1	C114	ECEA1CU331	330	1
R534	ERJ3GEYJ472	4.7K	1	C115	PQCUV1E104MD	0.1	S 1
R535	ERJ3GEYJ272	2.7K	1	C116	ECEA1AKA221	220	1
R536	ERJ3GEYJ153	15K	1	C117	PQCUV1E104MD	0.1	S 1
R537	ERJ3GEYJ394	390K	1	C118	ECEA1CKS220	22	S 1
R538	ERJ3GEYJ562	5.6K	1	C119	PQCUV1H103KB	0.01	1
R539	ERJ3GEYJ271	270	1	C120	ECEA1EK470	47	S 1
R540	ERDS2TJ223	22K	1	C121	ECST1AX226	22	1
R541	ERJ3GEYJ565	5.6M	1	C122	PQCUV1H101JC	100P	1
R543	ERDS2TJ333	33K	1	C123	ECEA1CKS100	10	S 1
R544	ERD25TJ105	1M	1	C124	ECEA1CKS220	22	S 1
R545	ERJ3GEYJ823	82K	1	C125	ECKWKH332ME	0.0033	△ 1
R546	ERJ3GEYJ472	4.7K	1	C201	ECUV1H220JCV	22P	1
R547	ERJ3GEYJ184	180K	1	C202	ECUV1H220JCV	22P	1
R548	ERJ3GEYJ102	1K	1	C203	ECUV1H180JCV	18P	1
R549	ERJ3GEY0R00	0	1	C204	ECUV1H180JCV	18P	1
R550	ERDS2TJ333	33K	1	C205	PQCUV1E104MD	0.1	S 1
R551	ERJ3GEYJ104	100K	1	C206	ECUV1H272KBV	0.0027	1
R552	ERJ3GEYJ473	47K	1	C207	ECUV1H333KDV	0.033	S 1
R554	ERJ3GEYJ184	180K	1	C208	EECW5R5D473	0.047	S 1
R556	ERJ3GEYJ682	6.8K	1	C209	PQCUV1C334ZF	0.33	1
R557	ERJ3GEYJ473	47K	1	C210	ECUV1C104KBV	0.1	1
R559	ERDS2TJ333	33K	1	C211	ECEA1AKA221	220	1
R561	ERJ3GEYJ103	10K	1	C301	ECUV1H681JCV	680P	1
R562	ERJ3GEYJ472	4.7K	1	C302	ECUV1H681JCV	680P	1
R563	ERJ3GEYJ394	390K	1	C303	ECUV1H681JCV	680P	1
R564	ERJ3GEYJ681	680	1	C304	ECUV1H681JCV	680P	1
R565	ERJ3GEYJ393	39K	1	C305	ECUV1H470JCV	47P	1
R566	PQ4R10XJ820	82	1	C306	ECUV1H470JCV	47P	1
R567	ERJ3GEYJ561	560	1	C307	ECUV1H470JCV	47P	1
R568	ERJ3GEYJ473	47K	1	C308	ECUV1H470JCV	47P	1
R569	ERJ3GEYJ563	56K	1	C309	ECUV1H470JCV	47P	1
R570	ERJ3GEYJ222	2.2K	1	C310	ECUV1H470JCV	47P	1
R571	ERJ3GEYJ222	2.2K	1	C311	ECUV1H470JCV	47P	1
R572	ERJ3GEYJ684	680K	1	C312	ECUV1H470JCV	47P	1
R573	ERJ3GEYJ680	68	1	C313	ECUV1H102KBV	0.001	1

MC-Service

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Ref. No.	Part No.	Part Name & Description	Pcs/Set
C314	ECUV1H470JCV	47P	1	C546	PQCUV1H223KB	0.022	1
C315	ECUV1H120JCV	12P	1	C547	ECUV1H471JCV	470P	1
C316	ECUV1H120JCV	12P	1	C558	ECUV1C683KBV	0.068	1
C317	PQCUV1E104MD	0.1	S 1	C559	ECUV1H153KBV	0.015	1
C319	ECUV1H102KBV	0.001	1	C560	PQCUV1H271JC	270P	1
C320	PQCUV1E104MD	0.1	S 1	C561	PQCUV1E104MD	0.1	S 1
C321	EECW5R5D473	0.047	S 1	C562	PQCUV1H271JC	270P	1
C322	ECUV1C104ZFB	0.1	1	C563	ECEA1AU102	1000	1
C323	ECUV1C104KBV	0.1	1	C564	ECEA1CKS100	10	S 1
C324	ECUV1C104ZFB	0.1	1	C565	ECUV1C104KBV	0.1	1
C401	ECUV1H060DCV	6P	1	C566	ECUV1H101JCV	100P	1
C402	ECUV1H101JCV	100P	1	C567	ECUV1C104KBV	0.1	1
C403	ECUV1C104ZFB	0.1	1	OPERATIONAL P.C.BOARD			
C404	ECUV1C104ZFB	0.1	1	PCB2	PQWP2CM941BH	P.C.BOARD ASS'Y (RTL)	1
C405	ECUV1C104ZFB	0.1	1				
C406	ECUV1H223KBV	0.022	S 1				
C407	ECEA1HKS010	1	S 1	IC701	PQVIMC4094BF	(ICS) IC	1
C408	ECEA0JU471	470	1	IC702	PQVIMC4094BF	IC	1
C410	ECUV1H102KBV	0.001	1				
C411	ECUV1H472KBV	0.0047	1				
C412	ECEA1CKS100	10	S 1				
C413	ECUV1H472KBV	0.0047	1				
C414	ECUV1H472KBV	0.0047	1				
C415	PQCUV1E104MD	0.1	S 1				
C416	ECUV1C104ZFB	0.1	1				
C417	ECUV1C104ZFB	0.1	1				
C418	ECUV1H103KBV	0.01	1				
C419	ECUV1H103KBV	0.01	1				
C421	ECEA0JK221	220	S 1	Q702	2SD601R	(TRANSISTORS) TRANSISTOR(SI)	1
C422	ECUV1H333KDV	0.033	S 1	Q703	2SD601R	TRANSISTOR(SI)	1
C423	ECUV1C104KBV	0.1	1				
C424	ECUV1H222KBV	0.0022	1				
C425	ECEA1CKS100	10	S 1	LED702	LNJ301MPUJA	(DIODES) DIODE(SI)	1
C503	ECUV1H101JCV	100P	1	LED703	PQVDSL210VC	DIODE(SI)	1
C504	PQCUV1C105ZF	1	1				
C505	ECUV1C104KBV	0.1	1				
C506	ECUV1H102KBV	0.001	1				
C507	ECUV1H682KBV	0.0068	1				
C508	ECUV1H682KBV	0.0068	1	LCD701	PQADHLC7124	(LCD) LIQUID CRYSTAL DISPLAY	1
C509	ECEA1HKS4R7	4.7	S 1				
C510	ECEA1CKS100	10	S 1				
C512	ECUV1C104KBV	0.1	1	CN701	PQJS14A36Z	(CONNECTOR) CONNECTOR	1
C513	ECUV1H682KBV	0.0068	1				
C514	ECUV1H332KBV	0.0033	1				
C515	ECUV1H181JCV	180P	1				
C516	ECEA1CKS100	10	S 1				
C517	ECEA1CKS100	10	S 1	R701	PQ4R10XJ104	(RESISTORS) 100K	S 1
C518	ECEA1HKS4R7	4.7	S 1	R703	PQ4R10XJ331	330	S 1
C519	ECUV1A105ZFB	1	1	R704	PQ4R10XJ331	330	S 1
C520	ECUV1C104KBV	0.1	1	R706	PQ4R10XJ223	22K	S 1
C521	ECUV1H822KBV	0.0082	1	R707	PQ4R10XJ223	22K	S 1
C522	ECEA0JKS220	22	1	J701	PQ4R18XJ000	0	S 1
C523	ECUV1H102KBV	0.001	1	J702	PQ4R18XJ000	0	S 1
C524	PQCUV1C224KB	0.22	1	J703	PQ4R18XJ000	0	S 1
C525	ECEA0JKS220	22	1	J704	PQ4R18XJ000	0	S 1
C526	ECUV1C683KBV	0.068	1	J705	PQ4R18XJ000	0	S 1
C527	ECUV1C104KBV	0.1	1	J706	PQ4R18XJ000	0	S 1
C528	ECUV1H182KBV	0.0018	1				
C529	ECUV1C104KBV	0.1	1				
C530	ECUV1H222KBV	0.0022	1				
C531	ECUV1C104KBV	0.1	1	C701	ECST1AX106	(CAPACITORS) 10	1
C532	ECUV1H102KBV	0.001	1	C702	PQCUV1E104MD	0.1	S 1
C533	ECUV1H101JCV	100P	1				
C535	ECUV1C104KBV	0.1	1				
C536	ECUV1H472KBV	0.0047	1				
C538	ECUV1C104KBV	0.1	1				
C539	ECUV1H471JCV	470P	1				
C540	ECUV1C104KBV	0.1	1				
C541	ECUV1C104KBV	0.1	1				
C542	ECUV1C104KBV	0.1	1				
C544	ECUV1H682KBV	0.0068	1				
C545	ECUV1H332KBV	0.0033	1				
				RF P.C.BOARD PARTS			
				PCB3	PQLZ10002Z	P.C.BOARD ASS'Y (RTL)	1

KX-TCM939-B/KX-TCM941-B

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

REPLACEMENT PARTS LIST**Portable Handset**

Note:

1. RTL (Retention Time Limited)
The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice.

Components identified by a Δ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms (Ω) K=1000 Ω , M=1000K Ω

All capacitors are in MICRO FARADS (μ F) P= μ F

*Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
------------	------------	---------	------	------	------

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG Type	ECSZ Type	Others		
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V	
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V	
2E:250V	2:200V	1V:35V	1C :16V	1J :63V	
2H:500V		0J:6.3V	1E,25:25V	2A :100V	

Ref. No.	Part No.	Part Name & Description	Pcs/Set
CABINET AND ELECTRICAL PARTS			
101	PQKM10331X3	FRONT CABINET	1
102	PQKF10248S1	CABINET COVER (for KX-TCM939-B)	1
102	PQKF10248X1	CABINET COVER (for KX-TCM941-B)	1
103	PQBX10302S	BUTTON	1
104	PQAX3P16Y	SPEAKER	1
105	PQJT10145Z	CHARGE TERMINAL	3
106	PQSA10069Z	ANTENNA	1
107	PQSX10073Z	KEYBOARD SWITCH	1
108	PQXA36SVC	CHARGE BATTERY	1
109	PQHR10601Z	SPACER	1
110	PQHG10504Z	SPACER	1
111	PQHX10816Z	INSULATOR	1
112	PQHG10500Z	SPACER	1
113	PQHX10792Z	SPACER	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
MAIN P.C.BOARD PARTS			
PCB100	PQWP941BRWRF	P.C.BOARD ASS'Y (RTL)	1
IC201	MN150837KD2	(ICS) IC	1
IC202	AN6122FA	IC	1
IC203	AN6183SAE1	IC	S 1
Q201	2SD1819A	(TRANSISTORS) TRANSISTOR(SI)	1
Q202	2SD1819A	TRANSISTOR(SI)	1
Q203	PQVDTB123E	TRANSISTOR(SI)	1
Q204	PQVDTTC144TU	TRANSISTOR(SI)	1
Q205	PQVDTTC144TU	TRANSISTOR(SI)	1
D201	PQVDPTZTE25	(DIODES) DIODE(SI)	1
D202	PQVDEC15	DIODE(SI)	1
D203	PQVDRB751V4	DIODE(SI)	1
D205	MA110	DIODE(SI)	1
D206	MA141WK	DIODE(SI)	1
D207	MA8150	DIODE(SI)	1
D208	PQVDPY1112H	LED	1
D209	PQVDPY1112H	LED	1
D211	PQVDBR1112H	LED	1
D212	PQVDBR1112H	LED	1
D218	MA110	DIODE(SI)	1
D220	MA110	DIODE(SI)	1
L201	PQLQR3ER10K	(COILS AND TRANSFORMERS) COIL	1
L202	PQLQR3ER10K	COIL	1
L203	PQLQR3ER10K	COIL	1
L301	MQLRE10NJF	COIL	1
VR201	EVN5ESX50B15	(VARIABLE RESISTORS) VARIABLE RESISTOR	1
VR202	EVN5ESX50B15	VARIABLE RESISTOR	1
VR203	EVN5ESX50B54	VARIABLE RESISTOR	1
X201	PQVBTCC3.99M	(CRYSTAL OSCILLATORS) CRYSTAL OSCILLATOR	1
X202	PQVCL3276N9Z	CRYSTAL OSCILLATOR	1
E101	PQEFBDB111GP	(ELECTRICAL PARTS) BUZZER	1
E102	PQJM122Z	MICROPHONE	1
CHG(+)	PQJT10090Z	BATTERY TERMINAL	S 1
CHG(-)	PQJT10090Z	BATTERY TERMINAL	S 1
CHG(C)	PQJT10090Z	BATTERY TERMINAL	S 1
CN203	PQJP2D13Z	CONNECTOR	1
R201	ERJ3GEYJ473	(RESISTORS) 47K	1
R202	ERJ3GEYJ103	10K	1
R203	ERJ3GEYJ105	1M	1
R204	ERJ3GEYJ103	10K	1
R205	ERJ3GEYJ103	10K	1
R206	ERJ3GEYJ332	3.3K	1
R207	ERJ3GEYJ100	10	1
R209	PQ4R10XJ105	1M	1
R210	ERJ3GEYJ103	10K	1
R211	ERJ3GEYJ332	3.3K	1



MC-Service

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Ref. No.	Part No.	Value	Pcs/Set
R212	ERJ3GEYJ222	2.2K	1	C217	ECUV1H222KBV	0.0022	1
R213	ERJ3GEYJ472	4.7K	1	C218	ECEA1CKS100	10	S 1
R214	ERJ3GEY0R00	0	1	C219	ECUV1C104ZFV	0.1	1
R217	ERJ3GEYJ103	10K	1	C220	ECUV1H472KBV	0.0047	1
R218	ERJ3GEYJ103	10K	1	C221	ECUV1C104KBV	0.1	1
R219	ERJ3GEY0R00	0	1	C222	ECUV1H103KBV	0.01	1
R220	ERJ3GEYJ473	47K	1	C223	ECUV1C683KBV	0.068	1
R221	ERJ3GEYJ100	10	1	C224	ECUV1C683KBV	0.068	1
R222	ERJ3GEYJ104	100K	1	C225	ECUV1H103KBV	0.01	1
R223	ERJ3GEYJ563	56K	1	C226	ECUV1H103KBV	0.01	1
R224	ERJ3GEYJ153	15K	1	C227	ECUV1C104ZFV	0.1	1
R225	ERJ3GEYJ153	15K	1	C228	ECUV1H682KBV	0.0068	1
R226	ERJ3GEYJ103	10K	1	C230	ECUV1H333KDV	0.033	S 1
R227	ERJ3GEYJ103	10K	1	C232	PQCUV1C105ZF	1	1
R229	ERJ3GEYJ563	56K	1	C233	ECUV1C104KBV	0.1	1
R230	ERJ3GEYJ124	120K	1	C234	ECUV1C104ZFV	0.1	1
R231	ERJ3GEYJ104	100K	1	C236	PQCUV1C105ZF	1	1
R232	ERJ3GEYJ104	100K	1	C237	ECUV1H471JCV	470P	1
R233	ERJ3GEYJ220	22	1	C238	ECUV1H472KBV	0.0047	1
R234	ERJ3GEYJ223	22K	1	C239	PQCUV1C474ZF	0.47	1
R235	ERJ3GEY0R00	0	1	C240	PQCUV1C105ZF	1	1
R236	ERJ3GEYJ333	33K	1	C241	ECUV1C104KBV	0.1	1
R238	ERJ3GEYJ333	33K	1	C243	ECEA0JKA331	330	1
R240	ERJ3GEYJ102	1K	1	C244	ECUV1C104ZFV	0.1	1
R241	ERJ3GEYJ273	27K	1	C246	ECEA1CKS470	47	S 1
R242	ERJ3GEYJ273	27K	1	C247	ECUV1C104ZFV	0.1	1
R243	ERJ3GEYJ333	33K	1	C248	ECUV1H180JCV	18P	1
R245	ERJ3GEYJ222	2.2K	1	C249	ECUV1H180JCV	18P	1
R246	ERJ3GEYJ100	10	1	C251	ECUV1C104KBV	0.1	1
R247	ERJ3GEYJ394	390K	1	C253	ECUV1H103KBV	0.01	1
R248	ERJ3GEYJ474	470K	1	C255	ECUV1C104KBV	0.1	1
R249	ERJ3GEYJ102	1K	1	C256	ECUV1C104KBV	0.1	1
R250	ERJ3GEYJ103	10K	1	C257	PQCUV1C105ZF	1	1
R251	ERJ3GEYJ222	2.2K	1	C258	ECUV1C104ZFV	0.1	1
R252	ERJ3GEYJ105	1M	1	C259	ECUV1C104KBV	0.1	1
R254	ERJ3GEYJ331	330	1	C260	PQCUV1E104MD	0.1	S 1
R255	ERJ3GEYJ331	330	1	C261	ECUV1C104KBV	0.1	1
R257	ERJ3GEYJ681	680	1	C264	ECST0JY106	10	1
R258	ERJ3GEYJ104	100K	1	C314	ECUV1H050CCV	5P	1
R259	ERJ3GEYJ104	100K	1	L302	ECUV1H030CCV	3P	1
R260	ERJ3GEY0R00	0	1	RF P.C.BOARD PARTS			
R261	ERJ3GEY0R00	0	1	PCB200	PQLZ10001Z	P.C.BOARD ASS'Y (RTL)	1
R262	ERJ3GEYJ102	1K	1				
R263	ERJ3GEYJ103	10K	1				
R264	ERJ3GEYJ101	100	1				
R265	ERJ3GEYJ101	100	1				
R266	ERJ3GEYJ102	1K	1				
R267	ERJ3GEYJ101	100	1				
R268	ERJ3GEYJ104	100K	1				
R269	ERJ3GEYJ153	15K	1				
R274	ERJ3GEYJ681	680	1				
R275	ERJ3GEYJ104	100K	1				
R276	ERJ3GEYJ330	33	1				
R277	ERJ3GEYJ104	100K	1				
R279	ERJ3GEYJ104	100K	1				
R281	ERJ3GEYJ102	1K	1				

KX-TCM939-B/KX-TCM941-B

This replacement parts list is U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Ref. No.	Part No.	Part Name & Description	Pcs/Set
KX-TC939-B/KX-TCM941-B			
ACCESSORY PARTS			
A1	KX-A11-6	AC ADAPTOR 	1
A2	PQJA10075Z	TEL CORD 	1
A3	PQKL24Z0	WALL MOUNT BRACKET	1
A4	PQYNTC911BR	BATTERY COVER	1
A5	PQQW11928Z	QUICK REFERENCE GUIDE (for English)	1
A5	PQQW11929Z	QUICK REFERENCE GUIDE (for Spanish)	1
A6	PQQX11902Z	INSTRUCTION BOOK	1
PACKING MATERIALS			
P1	PQPP170Z	PROTECTION COVER	1
P2	XZB10X35A02	PROTECTION COVER	1
P3	PQPD10386Z	CUSION	1
P4	PQPN10632Z	CUSION	1
P5	PQPK12575Z	GIFT BOX (for KX-TCM939-B)	1
P5	PQPK12502Z	GIFT BOX (for KX-TCM941-B)	1
TOOL			
ZZ1	PQZZ14K8Z	EXTENSION CORD	1
Note PQZZ14K8Z is useful for servicing (it make sevicig easy).			